

Evaluation of a Computer-Based Version of Child Planned Activities Training

By
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Abstract

Challenges to implementation, such as engagement in intervention activities and maintaining implementation fidelity, exist within traditional delivery systems of evidenced-based parenting programs that can impact either the effectiveness of or the wide-spread adaptation and use of an intervention. Given these challenges, research is needed to explore and identify additional delivery methods, and examine their impact on feasibility, acceptability, and effectiveness. Researchers have looked to technology as a promising supplement or alternative to traditional methods of delivery. Two studies examined the effects of a computer-based version of Child Planned Activities Training (cPAT), an evidence-based home visitation program that focuses on improving parent-child interactions, on parent's use of intervention strategies, parent-child interaction skills, and child behavior. The program combined computer-based tutorials with in-home coaching. Parent satisfaction, engagement during home visits, parental stress, and depressive symptoms were measured. Seven mothers and their children aged 3 to 5 years participated. Study 1 evaluated the pilot presentation of the intervention with one family as a means of understanding program feasibility and usability using an A-B design. Feedback from Study 1 informed revisions to the computer-based presentation and intervention procedures used in Study 2. Study 2 evaluated the effects of the revised computer-based intervention on parent and child outcomes using a multiple baseline design with six families, divided into two cohorts. The computer-based cPAT intervention was feasible to implement and parents reported high rates of satisfaction and usability. Results from Study 2 support the use of the computer-based cPAT intervention in improving parent use of cPAT strategies. Parent-child interaction skills and appropriate child behavior increased for all parents who completed the post-intervention observation ($n = 5$). Additionally, parent engagement in intervention activities increased or

remained high across all participants ($n = 6$). Changes in parent stress and depressive symptoms were observed in some but not all families. These findings contribute to the existing body of literature on the use of technology-based interventions for teaching positive parenting skills to families from low-income backgrounds with preschool-aged children. Additionally, the findings expand upon the body of research evaluating technology-based versions of cPAT by incorporating computer-based delivery of the intervention. Limitations and implications for future research are discussed.

Keywords: parent training, parenting intervention, parent-child interaction, child planned activities training, computer-based intervention, technology-based intervention

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Parents as Change Agents

Parent training programs have proliferated since the 1960s, when a shift occurred in the manner in which problematic behavior in children was addressed, moving from intervening directly upon child behavior to focusing on changing parent behavior (Kaminski, Valle, Filene, & Boyle, 2008). Prior to this shift, the primary approach to addressing young children with challenging behaviors involved referral to a clinic for treatment conducted by therapists; parents were kept apprised of their child's progress. Therapists described the techniques used and encouraged parents to try them at home. This approach was generally ineffective and as a result, was abandoned (Bijou, 1984). New approaches, based on social learning theory, began to recognize the importance of parental contributions to children's desirable and undesirable behavior and explore how parents could act as agents of children's behavior change (Kaminski et al., 2008). One approach that received a great deal of attention was behavioral parent training (BPT; Polster & Dangel, 1984). Behavioral parent training programs differed from the other parent training approaches in two major ways: (a) their focus on the active acquisition of parenting skills as compared to solely providing information and (b) their use of objective definitions and recording systems (Bijou, 1984).

In addition to the shift from therapists to parents as agents of change, the goals of parent training programs also shifted beyond the original goal of reducing child behavior problems. Currently, parent training interventions focus on a wide variety of outcomes, such as improving social-emotional development (Baggett, Davis, Feil, Sheeber, Landry, Carta, & Leve, 2010), promoting language skills (Huebner & Meltzoff, 2005), improving physical health (Shapiro, Bauer, Hamer, Kordy, Ward, & Bulik, 2008), and improving parenting practices among families at risk for child maltreatment (Bigelow & Lutzker, 1998).

Aside from focusing on parents as change agents and a variety of goals, parent training programs today may differ in many other dimensions (Kaminski et al., 2008). For instance, programs can differ by type of delivery setting (e.g., clinic, home). Home visiting is one type of parenting intervention that is used as a means of changing parent behavior. It is defined to some degree by the setting (e.g., Peterson, Luze, Eshbaugh, Jeon, & Kantz; 2007). It may or may not include behavioral parent training, but it is one common delivery method. Programs can also differ in content emphasis (knowledge-based vs. skills-based); the various delivery techniques used to teach relevant content (e.g., group discussions, homework, role plays, coaching); and the types of families served (e.g., children with identified cognitive delays or challenging behavior, parents from poverty backgrounds, parents with identified disabilities).

Elements of Effective Parent Training Interventions

Within this diverse landscape, which involves varied goals, methodology, and modes of delivery, researchers have attempted to determine the essential elements of effective parent training programs. For example, research has shown that active learning approaches like behavioral skills training are superior to passive approaches when it comes to behavior change. In their meta-analysis of parent training programs aimed at preventing child abuse, Lundahl, Nimer, and Parsons (2006) reported that behavioral programs that taught specific child management skills resulted in more positive changes in parental behavior than programs that focused on changing parental attitudes. Interestingly, similar results have been reported in health intervention research and indicate that changes in knowledge or attitudes do not guarantee changes in behavior (e.g., Albarracín et al., 2003; Kalichman, Rompa, & Coley, 1996). Active approaches like BPT have shown to be effective at improving a variety of parent and child outcomes. For example, a meta-analysis by Serketich and Dumas (1996) reported BPT to be an

effective treatment for modifying the antisocial behavior of children at home and at school and improving parental personal adjustment. Maughan, Christiansen, Jenson, Olympia, & Clark (2005), in another meta-analysis, reported that BPT is an effective intervention for modifying challenging behaviors in children with externalizing behaviors and disruptive behavior disorders. BPT has also been used successfully to teach parents of children with autism spectrum disorder to implement a variety of interventions with their children (e.g., Kaiser, Hancock, & Nietfeld, 2000; Koegel, Glahn, & Nieminen, 1978; Symon, 2005) and to improve parenting practices in parents at risk for child abuse and neglect (e.g., Gershater-Molko, Lutzker, & Wesch, 2003).

Moving beyond determining which approaches are more or less effective, researchers in parent training (in general) have also examined the specific content and delivery components associated with effective programs in order to determine those active ingredients that cause behavior change. For instance, in their meta-analytic review of BPT programs for managing children's behavior, Kaminski and colleagues (2008) conducted a comparison of program content (e.g., child development knowledge and care, positive interactions with child, discipline and behavior management) and delivery techniques (e.g., manual, modeling, homework, practice). They reported that content components of programs such as increasing positive parent-child interactions and emotional skills, teaching parents the importance of consistency, and teaching parents the use of time out were consistently associated with larger effects whereas other content components such as problem solving, promoting academic skills, and ancillary services (e.g., case management, educational assistance) were reliably associated with less successful programs. Additionally, they reported that delivery techniques that required parents to actively practice new skills with their children during parent training sessions were consistently associated with larger effects whereas programs without those components were associated with

less successful outcomes. Peterson et al. (2007) also reported that parent practice with their children was an important component in parenting interventions. They reviewed the intervention processes of two home visiting programs (Part C and Early Head Start). Higher maternal engagement levels were associated with intervention strategies that involved a mother interacting directly with her child.

In another meta-analytic review evaluating the effectiveness of a particular delivery setting, Sweet and Appelbaum (2004) reported that families of young children enrolled in home visiting programs fared better than control group families who did not receive home visitation (some of the studies compared home visiting to no treatment whereas other studies compared home visiting plus case management to case management alone). Although these types of programs provided benefit to both parents and children, it is unclear whether the home-based delivery was the essential element or if some aspect of the intervention (e.g., individualized treatment) was driving the improved outcomes. The meta-analysis conducted by Lundahl et al. (2006) indicated that home visitors made a substantial positive impact on parents at risk for abuse and neglect. Furthermore, programs that relied solely on group delivery were less effective in changing parent behavior as compared to those that used some amount of individual delivery (i.e., any type of one-on-one time spent between the parent and interventionist such as discussion, coaching, and feedback). They concluded that parent training programs should include an individual component. In summary, research has indicated that effective parent training programs include the use of behaviorally based approaches that focus on active skills training; a content emphasis on parent-child interactions, communication skills, and behavior management skills such as maintaining consistency; use of parent practice as a delivery

technique; and incorporation of an individual delivery component such as one-on-one coaching as compared to relying solely on group-based delivery.

One behavioral parent training program that includes many of these elements is Planned Activities Training (PAT; Sanders & Dadds, 1982), a behavioral parenting approach that emphasizes child engagement as a strategy for preventing challenging behaviors. Planned Activities Training (sometimes also referred to as Child Planned Activities Training) is one intervention component of SafeCare, an evidence-based parent-training program that reduces child maltreatment by providing parents with concrete skills in three areas: health, home safety, and parent-child or parent-infant interactions (for a history and description of SafeCare, see Guastafarro, Lutzker, Graham, Shanley, & Whitaker, 2012). When used with families at risk or reported for child abuse and neglect, the PAT intervention has been reported to be effective at improving both parent and child behavior (Bigelow & Lutzker, 1998; Carta, Lefever, Bigelow, Borkowski, & Warren, 2013). For example, Bigelow & Lutzker (1998) evaluated a video-based version of PAT with two families reported for child abuse and neglect. They reported improved parent use of PAT strategies, parent appropriate behavior, and child appropriate behavior. Carta et al. (2013) evaluated the effectiveness of PAT-as-usual and cell-phone enhanced PAT with high-risk families. Results indicated that mothers receiving PAT-as-usual and cell phone-enhanced PAT demonstrated more frequent use of PAT strategies and engaged in more responsive parenting as compared to mothers in the wait-list control group. Additionally, children of mothers receiving PAT-as-usual and cell phone-enhanced PAT demonstrated higher rates of positive engagement. Changes for both mother and child behavior were maintained at 6-month follow-up. The PAT intervention has also been implemented with families of children with challenging behaviors and was demonstrated to be effective at improving parent and child

behavior, as well as promoting generalization of parent behavior across a variety of settings (Harrold, Lutzker, Campbell, & Touchette, 1992; Huynen, Lutzker, Bigelow, Touchette, & Campbell, 1996; Sanders & Dadds, 1982). For example, Huynen et al. (1996) used PAT to teach mothers to plan and structure activities to prevent challenging behaviors in their children with developmental disabilities. They reported generalization of parent behavior across three settings and maintenance of skills at 3-month follow-up. Lastly, a Spanish version of PAT has been demonstrated to be effective at improving parent outcomes. Cordon, Lutzker, Bigelow, and Doctor (1998) evaluated Spanish protocols for teaching child health care training, PAT, and home safety training with a Spanish-speaking mother reported for child abuse. Once the PAT intervention was introduced, the mother's use of PAT behaviors and appropriate interaction skills with her child increased. Additionally, the mother's use of PAT behaviors generalized to an untrained activity. Follow-up observations indicated that changes in the mother's behavior were maintained six months after training.

The focus of PAT is on teaching parents a set of strategies that set the occasion for child engagement and appropriate behavior, thus reducing the need for more reactive interventions that focus on decreasing inappropriate behavior. For instance, parents are taught to plan activities in advance, prepare the child for activities by explaining the activity, and set expectations for appropriate behavior by explaining rules and consequences. Parents are also taught to use positive interaction skills (e.g., eye contact), talk to the child warmly about the activity, give choices, reinforce appropriate behavior, and ignore minor misbehavior. The PAT intervention is delivered during six weekly visits in the parent's home. Daily activities selected by the parent are addressed one-at-a-time. Implementation strategies include explanation and description of the strategies presented by the home visitor, provision of written materials (e.g., manual) to

supplement instruction, modeling of the strategies by the home visitor, parent practice of the strategies with their child, and coaching and feedback provided by the home visitor regarding the parent's performance.

Implementation Challenges Associated with Parent Training Interventions

Even when effective, evidence-based parenting programs are implemented, challenges to implementation exist within traditional delivery systems that can impact the wide-spread adoption and use of an intervention, as well as its effectiveness. For example, a challenge for many providers of parenting programs is to recruit, retain, and engage parents in programs (Mytton, Ingram, Manns, & Thomas, 2014). This challenge is of particular relevance to home visitation programs where mothers and children typically only receive about half the number of recommended visits stipulated by the program (Ammerman, et al., 2006; Gomby, 1999). Disengagement leads home visitors to spend valuable and scarce time and resources trying to re-engage mothers and may limit the impact of the program and undermine its effectiveness. Maintaining adequate levels of engagement is especially difficult with high-risk families who are highly mobile and who often live in environments with multiple family members where home visits may be perceived as intrusive, interruptions are frequent, and lack of privacy makes sensitive topics hard to discuss (Lanzi, et al., 2007).

Accessibility to interventions creates another type of challenge. For parents living in rural or remote areas, finding reliable transportation to clinic-based programs may be difficult and home visitation programs may not be widely available in their area (Connell, Sanders, Markie-Dadds, 1997; Jones, Forehand, McKee, Cuellar, & Kincaid, 2010; Sanders, 1999). Other barriers such as lack of child care and limited flexibility with work schedules create obstacles in accessing parenting programs (Feil, Baggett, Davis, Sheeber, Landry, Carta, & Buzhardt, 2008).

Furthermore, dissemination of evidence-based programs is often impeded by low adherence to protocols, inadequate resources, and poor support and training (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005; Webster-Stratton & Herman, 2010). These obstacles can prevent an effective parenting program developed in a research setting from being successfully scaled-up into field practice to serve large populations of parents in need (Funderburk, Ware, Althsuler, & Chaffin, 2008). For example, in a review of two home visiting programs, Peterson et al. (2007) reported that families' actual intervention experiences often did not match the stated goals of each program. It becomes impossible to evaluate the efficacy of a program if it is not being implemented with high fidelity. Effective implementation methods are required to assure consistent use of evidence-based programs and reliable benefits to families (Fixsen, Blase, Metze, & van Dyke, 2013). Given the challenges faced by traditional delivery systems, it becomes important that effective parenting programs be adapted to incorporate other delivery methods and that research examines the feasibility, acceptability, and effectiveness of those adaptations.

Benefits of Technology-Based Interventions in Human Service and Health Interventions

Researchers have looked to technology as a promising supplement or alternative to traditional methods. The term technology is broadly defined as “the practical application of knowledge especially in a particular area” (Merriam-Webster’s online dictionary, n. d.). This definition encompasses almost any information, objects, or equipment that have been used in application to a field of study. A more specific use of the term refers to processes that increase productivity and reduce or eliminate operations performed manually or by older technologies (Goldsmith & LeBlanc, 2004). For the purpose of this paper, technology denotes a variety of

electromechanical or digital devices such as cell phones, smart phones, video recording equipment, videoconference equipment, web cameras, tablets, and desktop or laptop computers.

Technology has been incorporated into a variety of interventions and training programs within human service and behavioral health fields to address challenges related to engagement, availability, accessibility, quality, and cost-efficiency. Examples of these interventions include teaching academic skills to children with autism (e.g., Grynzpan, Weiss, Perez-Diaz, & Gal, 2014; Knight, McKissick, & Sauders, 2013), treatment of substance abuse disorders (e.g., Litvin, Abrantes, & Brown, 2013; Marsch, 2011), increasing medication adherence (e.g., Park, Howie-Esquivel, & Dracup, 2014), sexual health promotion and HIV prevention (e.g., Bailey, et al., 2010; Noar, 2011), smoking cessation (e.g., Brown, 2013; Walter, Wright, & Shegog, 2006), promoting healthy eating and weight loss (e.g., Fjeldsoe, Marshall, and Miller, 2009; Khaylis, Yiaslas, Bergstron, & Gore-Felton, 2010; Preston, Walhart, & O'Sullivan, 2011; Reed, Schifferdecker, Rezaee, O'Conner, & Larson; 2012), and treatments such as cognitive behavioral therapy (CBT) or psychoeducational therapy (e.g., Carroll et al., 2014; Ramsey & Montgomery, 2014). Within these programs, technology has been used either (a) as an adjunct to supplement or enhance an existing intervention or (b) as a delivery method to duplicate or replace an existing intervention that was previously delivered with another method (e.g., written materials, face-to-face with a therapist).

In many cases, both types of technology-based interventions have resulted in similar or improved outcomes compared to the traditional delivery methods that they were enhancing or replacing. Additionally, these interventions have been effective in addressing some of the implementation challenges faced by traditional delivery methods. For example, Carroll et al. (2014) used a computer-enhanced supplement to CBT in an outpatient methadone program in

order to address challenges to engagement and retention that are typically associated with highly challenging clinical populations (i.e., cocaine dependent individuals). Participants in the computer-enhanced condition received standard treatment, which consisted of daily methadone maintenance and weekly group sessions, plus access to a computer-based CBT program. The computer-based program used a combination of videos, games, cartoons, quizzes, and other interactive exercises to teach and model the effective use of CBT skills and strategies.

Participants in the computer-enhanced group had significant improvements in cocaine and drug use outcomes as compared to participants who only received the standard treatment. These improvements were maintained at the 6-month follow-up. Additionally, engagement and retention in the CBT supplement condition was high, as compared to the standard treatment alone. Watts et al. (2013) investigated the effectiveness of an Internet-based CBT intervention for the treatment of depression in order to address challenges related to accessibility, cost efficiency, and treatment fidelity. Unlike the previous study discussed, which used technology as an adjunct, the Internet-based intervention under investigation was the primary medium for intervention delivery. Participants accessed the program either from a computer or smartphone with minimal contact from therapists. Results indicated clinically significant improvements in outcomes for participants. Additionally, adherence was high with 69% of participants completing the entire program. The intervention was easily accessible and due to the minimal contact with therapists, was less time and cost intensive.

Noar (2011) reviewed the use of computer-based HIV prevention interventions to reduce the cost associated with traditional delivery, maintain intervention fidelity, and increase accessibility. Their review indicated that the use of computer-based interventions in HIV prevention had a significant effect on HIV/AIDS knowledge, sexual/condom attitudes, condom

self-efficacy, perceived susceptibility, condom communication, condom intentions, and condom use. Lastly, Fjeldsoe, Marshall, and Miller (2009) reviewed health behavior change interventions delivered via text messages. Of the 14 studies reviewed, 13 demonstrated positive behavior changes. The authors discussed the benefits of text message delivery for population-wide dissemination. Typically, behavioral health interventions are initiated face-to-face during a consultation with a health care professional. However, preventive health interventions require delivery channels that reach individuals not engaged with health professionals. Text messaging provides such a channel and can help eliminate barriers created by traditional delivery methods.

It is important that evidence-based interventions reach the populations for which they are designed to benefit (McGorona, Hvizdos, Bocknek, Montgomery, & Ondersma, 2018). This is especially true for children from low-income backgrounds, who are at increased risk for poor outcomes such as challenging behavior and deficits in school-readiness skills (Bradley & Corwyn, 2002; Baker, Cameron, Rimm-Kaufman, & Grissmer, 2012; Kaiser, Hancock, Cai, Foster, & Hester, 2000; Raz & Bryant, 1990). Teaching parents from low-income backgrounds positive parenting skills is one way to mitigate these risks, and a number of parent training programs have demonstrated efficacy with this population (e.g., Baggett, et al, 2010). There are many evidence-based parent training interventions available to the public, including parents from low-income backgrounds (Breitenstein, Gross, & Christopherson, 2014). This is especially true for parents of at-risk children. Studies of face-to-face parent training interventions report that only 10% to 34% of parents of children enroll to participate (Baker, Arnold, & Meagher, 2011; Garvey, Julion, Fogg, Kratovil, & Gross, 2006; Heinrichs, Bertram, Kusxhel, & Hahlweg, 2005; Thornton & Calam, 2011). Attendance rates for parents who do enroll in these programs range from 35% to 50% (Breitenstein et al, 2014; Coatsworth, Duncan, Pantin, & Szapocnik, 2006;

Scott et al. 2010). This is especially evident among parents from low-income backgrounds, with factors such as lack of time and scheduling conflicts being salient barriers to program engagement. Novel approaches to connect these parents with research-based training programs are clearly needed. Technology-based programs, specifically ones delivered through the Internet, are one possible path for expanding intervention reach. Technology-based interventions have been used to address implementation challenges such as accessibility, availability, engagement, fidelity, and cost-efficiency within the fields of human service and behavioral health. Technology could also provide a solution to the implementation challenges faced by parent training interventions.

The Use of Technology in Parent Training Interventions

A systematic literature review of the use of technology in parent training interventions was conducted (Whaley, 2018). Studies in which parenting interventions were either enhanced with or delivered through technological means were evaluated. The findings of the review are briefly summarized below.

The focus of the technology-based parent training interventions reviewed fell across one of three categories: improving parent knowledge and/or attitudes, teaching a variety of parenting skills, or teaching specific parent-child interaction skills. The majority of the studies reviewed focused on teaching specific parent-child interaction skills. Both technology-enhanced and technology-delivered interventions have been used in parent training with the majority of studies using technology as an enhancement to the intervention as compared to using technology for delivery of the intervention (see Table 1 for a quantitative summary of the focus of the intervention and type of technology across the 223 reviewed studies). The technological format or modality used in these studies fell into one of five categories: video, television, computer,

Internet, or other. Across these categories, how the technology was used varied with regard to whether the format was used as an enhancement to the intervention or used to deliver the intervention. For example, video was typically used to provide video modeling or video-based feedback for technology-enhanced interventions whereas video was used to provide didactic instruction and modeling for technology-delivered interventions. Both technology-enhanced and technology-based interventions employed the use of a range of formats including video, smartphones, cell phones, digital frames, videoconference technologies, and the Internet (see Figure 1 for a visual summary of how various technology formats were used). The majority of the studies reviewed employed randomized controlled group designs to evaluate the effectiveness of the technology-based intervention. Only a handful of articles were case studies. Additionally, the majority of studies reviewed were behavioral parenting training programs that focused on skill acquisition.

With respect to the impact of technology-based interventions on parent and child outcomes, of the studies reviewed both technology-enhanced and technology-delivered interventions have been used successfully to improve parent knowledge and teach parents to implement a broad variety of parenting skills, including parent-child interaction skills. Furthermore, technology-delivered interventions have been effectively used to teach parent-child interaction skills with little to no therapist involvement as compared to traditional delivery methods that rely heavily on therapist involvement. Specifically, 14 of the 17 BPT studies reviewed that used technology-delivered interventions to teach parent-child interaction skills and directly measured parent outcomes reported substantial improvements in parent behavior (e.g., Antononi, et al., 2014; Bigelow & Lutzker, 1998; Blom-Hoffman et al., 2007; Huebner & Meltzoff, 2005; Lambermom & van IJzendoorn, 1989; Meharg & Lipsker, 1991; O'Dell et al,

1982; Sheeber et al., 2012; Webster-Stratton, 1990, 1992). The implementation of parent-child interaction skills by parents after being taught by technology-delivered interventions can have positive effects on child outcomes. Specifically, all 17 of the studies reviewed that used direct measures reported significant improvements in child behavior (e.g., Antononi, et al., 2014; Baggett et al., 2009; Bigelow & Lutzker, 1998; Blom-Hoffman et al., 2007; Huebner & Meltzoff, 2005; Lambermom & van IJzendoorn, 1989; Meharg & Lipsker, 1992; O'Dell et al, 1982; Sheeber, et al., 2012; Wade et al., 2009; Webster-Stratton, 1990, 1992). Technology-delivered interventions may offer improvements over traditional delivery methods with regard to accessibility and attrition. Specifically, 12 of the 17 BPT studies reviewed involved participants accessing the intervention on their own in a setting convenient to them (as compared to therapist-led interventions that are clinic-based) and in a self-paced manner (e.g., Antonini et al., 2006; Baggett et al., 2009; Bigelow & Lutzker, 1998; Huebner & Meltzoff, 2005; Lambermon et al., 1989; Sheeber et al., 2012; Wade et al. 2009). Lastly, 5 of the 17 BPT studies reported relatively low attrition rates (e.g., Antonini et al., 2009; Baggett et al., 2009; Bigelow & Lutzker, 1998; Sheeber et al., 2012).

Only twenty-two studies focused on providing parent training interventions to families from low-income backgrounds. The majority of those studies focused on teaching positive parenting skills with only two studies focusing on increasing parent knowledge (e.g., Gielen et al., 2007; Adedze, Orr, Chapman-Novakofski, & Donovan, 2013). Four of the twenty-one studies were Internet-based where parents could access the intervention in a self-paced manner (e.g., Baggett et al, 2010; Baggett et al., 2017; Breitenstein & Gross, 2013, and Sheeber et al., 2012). Of those studies, only three included direct measurement of parent behavior as compared to parent-reported measurement (Baggett et al, 2010; Baggett et al, 2017; Sheeber et al., 2012).

Direct measurement is defined as using naturalistic or standardized observations of parent behavior in a home or clinic setting. Naturalistic observations occur in the home environment during typical parenting activities with the duration of the observation varying as the activity varies, whereas standardized observations usually involve task-oriented activities that can occur in the home or clinic environment with standardized observation durations (e.g., 5 or 10 minutes in length). Direct observation is commonly argued as the more objective estimate of parent behavior as compared to parent reported methods (Wysocki, 2015). Of the three studies that included direct measurement of parent behavior, only one study focused on parents of preschool-aged children (Sheeber et al., 2012). Both of the Baggett et al. studies (2010, 2017) focused on mothers of infants. While Sheeber et al. (2012) recruited mothers of preschool-aged children (enrolled in Head Start), their study focused on depression. The study evaluated a cognitive behavioral treatment for depression with content adaptations that covered depressive symptoms and parenting; to be enrolled in the study, mothers had to report elevated levels of depression.

Although this review provides support for the use of technology-based interventions in parent training programs aimed at improving parent-child interaction skills with families from low-income backgrounds, there have only been four empirical studies evaluating the effects of technology-based versions of Child Planned Activities Training. Two studies evaluated the effects of a digital frame as a technology-based supplement to the intervention (i.e., Gaskin, Lutzker, Crimmins, & Robinson, 2012; Guastaferrero, Lutzker, & Graham, 2016) whereas one study evaluated the use of a cell phone as a technology-based supplement to the intervention (Carta et al., 2013). The fourth study evaluated the use of stand-alone video-based delivery of the intervention with little to no therapist involvement (Bigelow & Lutzker, 1998). Although the Carta et al. (2013) study demonstrated significant improvements in parent and child behavior

outcomes as well as increased parental engagement, the intervention used a technological enhancement (as compared to technological delivery). Technology use as a means to improve the implementation fidelity of the intervention was not a focus of the study. Due to the stand-alone nature of the video-based delivery that was evaluated, the Bigelow & Lutzker (1998) study offered benefits with regard accessibility and implementation fidelity. Additionally, parent outcomes were favorable. However, the study evaluated an outdated mode of delivery (videotape) that many homes may not have access to due to the rapidly changing landscape of technology and thus limits the generalizability of the findings. Additionally, the study used a multiple baseline design across two participants which limited the number of replications of the observed behavior change.

Further research is needed to evaluate technology-delivered interventions aimed at improving positive parenting skills with families from low-income backgrounds that incorporate direct measures of parent behavior. Additionally, more research is needed to evaluate technology-based versions of cPAT using forms of technology that parents can easily access.

Study Aims

Drawing on the findings reported from the technology-based interventions reviewed, a computer-based version of Child Planned Activities Training that combines computer-based tutorials with in-home coaching was developed and evaluated as part of the current studies. The studies have several aims and research questions (see Table 2 for a list of research questions). Study 1 tested a pilot version of Computer-Based Child Planned Activities Training (cPAT) with one family as a means of understanding the program's feasibility and utility, as well as feasibility of intervention procedures and measurement protocols. The results of Study 1 informed revisions to the program and improvements in intervention procedures for Study 2. The goal of Study 2

was to evaluate the effects of the revised version of Computer-Based cPAT on parent and child outcome measures.

General Method

Participants

Seven mother-child dyads participated in the study. Families were eligible if they met three criteria: (1) had at least one child between 3- and 5-years of age living in the home, (2) target child was typically developing, and (3) spoke English. Four families were dual-language speakers and spoke both English and another language in the home.

The seven dyads were grouped in the following manner: (a) one dyad participated in the pilot study that explored the usability and feasibility of the parent program, (b) three dyads participated in Cohort 1 of the full efficacy study, and (c) three dyads participated in Cohort 2 of the full efficacy study. In the pilot study dyad, the child was 5 years of age at baseline. Children in the Cohort 1 and 2 dyads ranged in age from 3 to 4 years at baseline. Across all three groupings, five of the children were male; two were female.

Mother and child demographics. Mothers' ages ranged from 24 to 34 years of age (see Table 3 for mothers' demographic information). Five mothers were married or living with a partner during the course of the study. One mother described her relationship status as single and another mother described her status as divorced. Five of the mothers had other children living in the home. For three of those parents, the designated focus child for the intervention was their youngest child whereas for the other two parents, the focus child was either their middle or oldest child. Two mothers were pregnant during their involvement in the study. Four mothers identified as Hispanic/Latinx; two mothers identified as Caucasian; one mother identified as

Asian; and one mother identified as Black/African American. Four moms were dual-language speakers and spoke both English and another language in the home with their children.

Three participants reported having earned a high-school diploma or equivalent degree (e.g., GED). Two participants reported attending some college courses, including one participant who was currently enrolled in school and seeking her associate degree. One participant reported earning her bachelor's degree. Another participant reported completing the 11th grade of high school. All participants reported family income that fell at or below 130% of the federal poverty guidelines. Five of the parents participated in early childhood home visiting services or parent education classes prior to their participation in the study. One parent was participating in home visiting services for a younger child during the course of the study. Four of the children were attending a preschool or pre-K program during the course of the study. Only one parent reported any history of involvement with child protection services; this involvement resulted in unsubstantiated reports of abuse.

At baseline, parents were asked about the range of strategies they use to manage their children's behavior. Setting rules, use of time-out, and talking to the child about their behavior were strategies that all the parents reported using (see Table 4).

Mothers' use of technology and access to the Internet. At the start of the study, participants were asked a series of questions about their technology use and experience (see Appendix D). All seven participants owned smartphones and accessed data plans through a cellular provider. Mothers reported using their smartphones on a regular to daily basis and for a variety of purposes including texting, emailing, web browsing, accessing social media, playing games, and watching videos (see Table 5). In addition to use of their smartphones, six mothers reported using other technological devices on a regular basis such as computers, laptops, tablets,

and e-book readers. Devices most frequently reported as being used on a regular basis were tablets and laptops: four families owned tablets and four families owned a desktop computer or laptop. All of the parents positively rated their level of comfort with using various forms of technology (including tablets and computers); six of the parents positively rated their level of comfort with using new or unfamiliar forms of technology (see Table 6). Four mothers reported that they accessed the Internet through services with land-based providers (e.g., DSL, Google Fiber) in addition to data plans from a cellular provider.

Recruitment and attrition. Recruitment efforts consisted of contacting key personnel at Women, Infants, and Children (WIC) food and nutrition program, home visiting programs (i.e., Early Head Start, Healthy Families America, Parents at Teachers), and early childhood programs (e.g., Head Start) serving the Kansas City area to request that they share the project's flyer with eligible families. Programs were also given copies of the consent form so they could have a better understanding of the study and commitments involved. These programs were chosen as recruitment sites because they provide support services to families with young children who are experiencing poverty or other socio-demographic risks. Although most of the local home visiting programs serve families of children ages 0- to 3- years old, program supervisors were asked to share the flyer with families with older children between the ages of 3 and 5 years within the family, as well (i.e., older siblings to children enrolled in home visiting programs). If a family met the eligibility criteria, program staff shared the flyer with the family, completed a referral and release of information form, and sent the form to the principal investigator. For two families, programs provided the flyer to the family and advised parents to contact the principal investigator independently. In addition to seeking referrals from these programs, direct recruitment was conducted at a local WIC office. Programs did not report the total number of

families they contacted about the study. Sixteen families were in contact with the principal investigator throughout the recruitment period. During initial contact with a family, the principal investigator scheduled a meeting at the family's home to discuss the study and review the informed consent form. Eight families agreed to participate, signed the consent form, and enrolled in the study. One family withdrew before starting any study-related activities and cited "won't have time to do the study" as the reason for withdrawing.

Setting

All observation sessions and intervention visits took place in the families' homes in rooms relevant to the daily activity of focus, with the exception of one family. For example, sessions took place in the kitchen for meal time activities, in the living room for play, or in the bedroom for bedtime routines, if these were areas where the activity would typically take place for a particular family. Observations and intervention activities were conducted in these areas in order to accurately assess typical behavior in the focus activities and to promote generalization and maintenance of strategies learned during the intervention.

One family worked in the childcare setting where her child attended; she requested to meet at this setting on four occasions due to scheduling constraints. Two baseline observations and two intervention visits (one full visit and one partial visit) took place in this setting. Observations and intervention activities were conducted in a small office that included a round adult-sized meeting table with two chairs, a small child-sized square table with two child-size chairs, and a small basket of toys.

Materials

Parent training materials. Families were provided with several items throughout the course of their involvement in the study. Materials used with each family include all of the

materials outlined in the Parent-Child Interaction Home Visitor Toolkit (SafeCare, 2012). These materials are typically used in the SafeCare Parent-Child Interactions Module (Guastaferrero et al., 2012) and include the Daily Activities Checklist, Child Planned Activities Training (cPAT) Parent Manual, cPAT Parent Overview checklists, cActivity cards, and cDevelop cards. The Daily Activities Checklist (DAC) was completed with each family to determine which daily routines the parent prefers to address during intervention and in what order. The DAC lists ten typical daily activities divided into two categories: interactive home activities and other activities. Interactive home activities included activities such as waking up, getting dressed, and play. Other activities included activities such as doctor appointments and errands. Additionally, parents may specify other activities that are not included on the list. The DAC was modified for the purpose of this study (see Appendix B). Interactive home activities were only listed on the DAC if they were addressed in one of the computer-based presentations. As a result, toileting and bath time were removed from the list. Parents were asked to rate on a 4-point Likert scale the amount of change they would like to see during the activity with regard to their child's behavior, ranging from "no change" to "a lot of change." The DAC was completed during the consent visit or first baseline session with the family and subsequently reviewed at the post-intervention visit.

The cPAT Parent Manual is a 34-page manual that contains diagrammed overviews of the cPAT strategies (e.g., what strategies are used before, during, and after an activity) and descriptions and rationales for each strategy. The first section of the manual focuses on using cPAT with general activities when the parent is available to interact with their child, whereas the second section focuses on how to use cPAT to engage a child in independent play when the parent is busy. The parent manual was placed inside a 3-ring binder, along with other program materials such as the cActivity Cards and cDevelop Cards. The cActivity Cards list and describe

28 different child-focused activities that parents can do with their children that require little to no materials and preparation. Examples include pretend cooking, exploring books, and playing dress up. The cDevelop Cards comprise developmental information for three- to five-year-old children. These cards list developmental milestones for each year of life across four domains: social/emotional, language/communication, thinking/problem solving, and movement/physical. Other materials included in the parent binder consisted of a parenting tips booklet with helpful facts about child behavior and a laminated one-sheet summary of all of the cPAT intervention steps (including descriptions and a brief rationale for using Cpat; Appendix C). The parent binder was briefly reviewed and given to parents at the beginning of the first intervention visit, along with the cPAT Parent Overview checklists described below. The binder and its contents were referenced during each visit: (a) parents were encouraged to review and interact with the materials during each computer presentation and (b) the family coach asked the parent about the materials during the check-in portion of each visit.

The cPAT Parent Overview checklists outline the ten cPAT strategies used during daily activities (e.g., play, meals, when parents are busy with other activities). The strategies are listed on the left with blank space provided on the right for parents to write notes. Additionally, there are prompts at the bottom of the page for the parent to note their progress (e.g., things that went well during practice). Several copies of these checklists were included in the parent manual binder offering several options for reference: within the pages of the manual for reference, copies in the back flap of the binder for use during the intervention, and re-useable laminated copies in the front flap of the binder for use after the intervention. The cPAT Parent Overview was frequently referenced during the computer-based presentation to prepare parents for practice of the cPAT behaviors. In the last portion of each computer-based presentation, parents were

prompted to review the cPAT Parent Overview and, as needed, make notes to tailor the cPAT strategies for their practice (i.e., write examples of choices they planned to give during the activity). Additionally, the cPAT coach referred to the overview during the coaching and feedback portion of practice and assessment.

Computer-based presentations. For the purpose of these studies, a computer-based version of Child Planned Activities Training was developed over the course of six months. Four presentations were created using Apple Keynote software, one for each activity addressed in intervention: play, getting ready, mealtime, and independent play. Video models were recorded and edited using Adobe Premiere Pro software and were included in each presentation. Each computer-based presentation of Child Planned Activities Training was presented on a MacBook Pro laptop. The researcher brought the laptop to each weekly intervention visit so that the parent could view the presentation for that particular intervention visit. A brief description of each presentation will be provided below.

The first computer-based presentation (Intervention Visit 1: Getting Started) introduced the cPAT program and its purpose. The first slide detailed each of the activities that would be covered over the course of the intervention and explained that the focus of the current presentation was using the cPAT strategies during a play activity. In subsequent slides, the presentation explained how the strategies are organized and then described each of the ten strategies along with the rationale for using them. The strategies were described by taking the parent through a hypothetical game activity with a child and giving examples of how each strategy would be used before, during, and at the end of the activity. Once all of the ten strategies were explained in the hypothetical game activity, the participant watched a video model of a parent demonstrating the strategies during a game activity with her child. Each time a strategy

was demonstrated, an on-screen label appeared at the bottom of the screen that identified what strategy was demonstrated (e.g., Prepare in Advance). Additionally, the video paused, and narration explained the demonstrated strategy (e.g., “Notice how the mom prepared in advance by having three different games out and available for her son to choose from at the start of the activity.”). After the narration, the label disappeared from the bottom of the screen and the video resumed playing. This pattern repeated upon initial demonstration of each strategy. For strategies that could occur multiple times throughout the activity, such as giving choices and praising desired behaviors, the narrated explanation and video freeze-frame would occur once; subsequent demonstrations were noted only by the on-screen strategy label appearing at the bottom of the screen at the time of the demonstration.

After the video model played, a list of all of ten strategies appeared on the screen. Then the participants watched the video model again. The second video was shorter, did not include the narrated explanations and freeze-frames, and only included on-screen labels that appeared at the bottom of the screen each time a strategy was demonstrated. Following this second viewing of the video model, parents completed a three-question multiple choice quiz to test their knowledge of the strategies that were demonstrated in the video model. Participants received feedback for correct and incorrect responses and were prompted to repeat a question if they answered it incorrectly. For example, when participants selected a correct response, a slide appeared that informed the participant that they selected the correct response and explained why the response was correct. Once the quiz was complete, participants watched a new video model of a mother engaging in a play-dough activity with her two young children. This video model only included on-screen labels that appeared at the bottom of the screen identifying a strategy when it was demonstrated and did not include any narrated explanations or freeze-frames.

Following this video, a summary slide reviewed the contents of the presentation and described each of the ten cPAT strategies (see Appendix A for screen captures of the video models used in each presentation).

Following this review, the parents engaged in “guided practice.” The cPAT Parent Overview appeared on the screen and the parent was instructed to remove a copy of the overview from their parent binder. The guided practice slides provided written and narrated prompts for the parent to practice the cPAT strategies with their child during a play activity and informed the parent that the family coach would be available for support during their practice. The parent overview was divided and reviewed section by section (e.g., strategies to use before, during, and at the end of the activity) with the parent. A section of the parent overview would appear on the screen (e.g., what to do before the activity) and the parent was instructed to take notes on how they would demonstrate the strategies for each section and then would proceed to the next slide when they were ready. Once the parent had reviewed each of the three sections of the parent overview, the presentation was complete.

Each presentation slide was narrated and animated with pictures, graphics, and text. Text was offered as a supplement to the narration, but participants did not need to read any of the text to understand the content of each slide. When the animation and narration for each slide was complete, arrows appeared at the bottom of the screen so that participants could advance to the next slide or return to the previous slide. This prevented participants from rushing through slides or not watching a video model in its entirety. The length of the first computer-based presentation was approximately 40 minutes in length, with 14 minutes of content teaching about the strategies and their rationale before the first video model is played. The duration of the presentation was longer if quiz questions were answered incorrectly and any slides were viewed more than once.

Additionally, the actual duration may have been longer for some participants because the 40-minute estimate does not account for the time taken between slides during the guided practice portion when parents were thinking about how to demonstrate the strategies or taking notes.

Subsequent intervention visits were shorter but followed a similar pattern. Each presentation started with a recap of what was covered the previous week and then moved on to a brief rationale of why using cPAT during the current activity was being addressed. Then participants watched the first video model. Similar to the play presentation, the first video model included the narrated explanations, freeze-frames, and on-screen labels the first time a strategy was demonstrated. Once the video played, a summary slide of the ten strategies appeared and participants were given three options: (a) to proceed directly to the quiz, (b) to watch a briefer version of the video with only on-screen labels, or (c) to watch the narrated version again. Whatever their choice, participants eventually proceeded to a three-question quiz covering the strategies demonstrated in the video model. Following the quiz, a summary was presented of the ten strategies and then participants advanced to the guided practice. The guided practice portion was similar to the play presentation. The narration was shorter with less explanation of each the strategies provided during each section of the parent overview.

The second and third computer-based presentations addressed getting ready and mealtime activities. The order of presentation depended on what activities parents rated as needing the most change on the Daily Activities Checklist. The fourth computer-based presentation covered independent play when parents are busy. The getting ready and mealtime computer-based presentations were approximately 18 minutes in length and included 3 minutes of content before the first video model was played. The independent play computer-based presentation was

approximately 20 minutes in length and included 5 minutes of content before the first video model played.

Data collection and observation materials. An iPad Air 2 tablet was used to record parent responses to some of the measures collected at baseline and post-intervention. Qualtrics (Provo, UT) online survey software was used to create and administer collection of these measures. A digital camcorder was used to record daily activity observations during all conditions. During intervention visits, video recordings were also made while parents watched the computer-based presentation and while they received coaching or feedback. When possible, a small tabletop tripod was used for the camera to stand independently on a counter, table, or couch. Recordings were initially saved on an encrypted memory card during home visits. After each visit, they were transferred to and stored on one of two encrypted external hard drives. Data collection materials such as pencils, data sheets, and Microsoft Office Excel computer software were also used.

Parent and child compensation. To compensate parents for their time completing the study, parents were provided up to \$120 for completing the entire study. This payment was divided into two parts based on completion. Parents received \$30 for completing the baseline questionnaire and observations, and \$90 for completing the post-intervention questionnaire and observations. To show appreciation for their time and involvement, both the parent and the child could select one item from a bag following each visit. The bag contained \$1-\$5 toys and household goods such as towels, soap, candles, books, toys, and coloring books with crayons. At each visit, the parent and child were each given a choice of three items to choose from. Choice options varied across visits. Additionally, at the end of the study, parents were given the option

of receiving digital copies of the daily activity recordings made during the study. Recordings were copied to either a DVD, CD, or flash drive based on parent preference.

Dependent Variables

The following dependent variables were used to assess parent and child behavior (see Table 7 to review the time points each measure was collected during each condition). Figure 2 indicates the theory of change for the intervention and how outcome and impact measures were assessed.

Primary outcome: Parent use of cPAT strategies. Parent use of cPAT strategies was assessed during various daily activities using the Child Planned Activities Training Home Visitor (cPAT HV) Assessment Form (Appendix E). This form was completed throughout baseline, intervention, and at post-intervention for both studies (refer to Lutzker & Bigelow, 2002, for observational definitions of the cPAT strategies).

The cPAT HV assessment form lists the ten strategies taught during Child Planned Activities Training. Under each strategy, essential components were listed as bulleted items. Some strategies had up to three bulleted “essential” items listed whereas other strategies had only one item listed. Next to the column for each strategy, a column for noting the score was included, along with a column for the observer to write notes.

By assessing the parent use of each of the ten cPAT strategies, the cPAT assessment form provided a measure of parent fidelity in delivery of the intervention. During each assessment, the parents were observed and scored on the occurrence of these behaviors during various daily activities. Each strategy was scored in one of three ways: *check plus*, *check*, or *minus*. A *check plus* score was defined as (a) demonstrated the behavior consistently and with ease and (b) performed all bulleted items. A *check* score was defined as (a) needs improvement in ease and/or

consistency of the behavior and (b) performed at least one bulleted item. A *minus* score was defined as: no demonstration of the behavior at all. For some behaviors, the parent had to demonstrate a minimum frequency of behavior to be scored as demonstrating that behavior. For example, the bulleted item under the give choices strategy noted that the parent needs to provide two or more choices during the activity. If the parent did not meet this minimum requirement and only gave one choice, the strategy was scored as *minus*. These scores were tallied and calculated into a percent correct score (e.g., if the parent demonstrated 8 of the 10 cPAT strategies, the score would be 80%). Both *check* and *check plus* scores were counted as correct when tallying percent correct for the observation. If a child did not engage in minor misbehavior during an observation, a score of *not applicable* was permitted and the total possible strategies that could be demonstrated correctly was reduced from ten to nine.

The cPAT HV assessment form was used for all activities with the exception of independent play. For independent play, a different version of the cPAT assessment form was used: Child Planned Activities Training Home Visitor Assessment Form Independent Play (cPAT IP). This form included many of the same strategies listed on the cPAT assessment form. However, four strategies that focused on interaction during an activity were replaced with strategies that focused on strategies for supporting sustained child engagement in play while the parent was busy. The same scoring conventions were used for the cPAT IP assessment form.

For Study 1, the cPAT HV assessment form was used to assess parent use of cPAT strategies during three activities: (a) free play, (b) mealtime, and (c) getting ready. For Study 2, the cPAT HV assessment form was used to assess parent use of cPAT strategies during the following five activities: (a) free play (b) mealtime (c) getting ready, (d) independent play, and (e) a cleanup activity. The cleanup activity was a novel activity that was not intervened upon and

was used to evaluate generalization of cPAT strategies at post-intervention. Mealtime activities included breakfast, snack, and lunch times. Getting ready activities included getting ready to go to school, getting ready for bed, and getting ready to leave the home. For getting ready, the parent chose the activity based on the amount of change they said that activity needed on the Daily Activities Checklist. Following the initial baseline observation of play in Study 2, the cPAT HV assessment form was also used to assess parent use of cPAT strategies during subsequent baseline play observations.

During intervention, the cPAT HV assessment form was used to measure parent use of cPAT strategies during each of the focus daily activities. Free play was observed and assessed throughout baseline; parent performance as measured by the cPAT HV assessment form during these free play observations was used to make intervention decisions determine when the intervention was introduced. Once free play was intervened upon, parent performance as measured by the cPAT HV assessment form was used to determine when subsequent daily routines were introduced in the intervention.

Parent engagement in intervention activities. Two scales were used to measure parent engagement in the intervention activities: an adapted version of Parent Engagement Rating Scale (PERS; Baggett, 2003) and Scale 6 of the Home Visit Rating Scales—Adapted and Extended (HOVRS-A+; Roggman et al., 2010). The PERS (Appendix F) is home visitor report that measures various aspects of parent engagement during each intervention visit. Parent engagement and participation in the visit were rated using a 3-point scale on items such as engagement during visit, participation in discussions, participation in new skills practice, mastery of intervention visit skills, completion of homework, amount of distractions during visit, and the degree to which distractions interfered with the visit. Definitions for each rating are included on

the form. Ratings for each item were summed to produce a parent engagement score for each visit. Higher scores indicate higher levels of engagement and participation. Total possible scores ranged from 18 to 24, depending on the focus of the visit. For example, participants were not rated on homework completion at Intervention Visit 1 because homework had not been assigned. Additionally, the visit length, the number of times the parent rescheduled or did not show up for the appointment, and whether or not the parent completed the program were also recorded on the PERS form. The PERS has acceptable internal consistency, with coefficients ranging from .65 to .79 (Lefever, et al, 2003). Scale 6 of the HOVERS-A+ measure was designed to examine the engagement of the parent and the activities of the home visit. Parents are rated across a 7-point scale on their (1) level of interest; (2) involvement and initiative; and (3) physical closeness to the home visitor and child. High ratings indicate the parent is interested and engaged in the home visit activities and discussion. The HOVERS-A+ has seven scales in total with good internal consistency across all scales (7 scales, $\alpha = .88$) and across Scale 6 in particular (7 items, $\alpha = .83$). Both the PERS and HOVERS-A+ (Scale 6) were completed after every intervention visit for both studies.

Parent satisfaction and ease of use. Two surveys were used to evaluate parent satisfaction with cPAT intervention and the computer-based cPAT program. The cPAT Parent Satisfaction Survey (Appendix G) is a 14-item questionnaire that focuses on parent satisfaction with the content, process, and outcome of the intervention; the usefulness of the strategies; and the parent's experience with the intervention and family coach. The cPAT Computer Presentation Satisfaction Survey (Appendix H) is an 8-item questionnaire that focuses on the length and appropriateness of the computer-assisted format as well as parent satisfaction with specific components of the computer-based presentation, such as organization and clarity. Items

were rated on a 5-point Likert scale for each questionnaire. Parents were asked to complete both surveys at the post-intervention visit in both studies.

In addition to the questionnaires described above, the participant in Study 1 was asked to complete a brief 5-item ease-of-use and satisfaction survey (Appendix J) at the end of each visit. The parent rated items on a 7-point Likert scale that addressed her overall reaction to the computer presentation in three ways (terrible to wonderful, difficult to easy, and dull to stimulating), ease of reading the characters on the screen (confusing to very clear), and the organization of the information (confusing to very clear). This information was used to systematically (a) assess usability/feasibility in the pilot to inform revision and (b) assess the acceptability of those changes so that the revisions took place in an iterative fashion, with input from the parent informing each revision. In order to further assess usability, the parent in Study 1 was encouraged to talk aloud during the computer presentation about problems she experienced with the slideshow (e.g., finding navigation buttons). These “talk-alouds” were documented by the researcher using an evaluation form (Appendix I) with any other behaviors that the parent engaged in related to ease of use or satisfaction (e.g., comments about certain videos).

Parent-child interaction skills. The Indicator of Parent Child Interaction (IPCI; Baggett, Carta, & Horn, 2009) is a progress monitoring measure designed to assess parenting skills and parent-child interactions. The IPCI measures twelve parent and child behaviors using a 30-second partial interval recording system (see Appendix K for the IPCI data sheet). The parent behaviors measured are: (a) conveys acceptance and warmth, (b) uses descriptive language, (c) follows child’s lead, (d) maintains or extends child’s focus, (e) uses criticism or harsh voice, and (f) uses restrictions/intrusions. The child behaviors measured are positive feedback, sustained engagement, follows through, irritable/fuss/cry, external distress, and

frozen/watchful/withdrawn. The IPCI was administered at baseline and post-intervention for both studies during the free play observation.

Child behavior. The Behavior Assessment Scale for Children, Second Edition, Parent Rating Scales (BASC-2-PRS) and the Child Behavior Rating Scales (CBRS) were used to assess child behavior. The BASC-2 PRS (Reynolds & Kamphaus, 2004) is a parent report measure of child adaptive and problem behaviors in the community and home setting. The preschool version (ages 2 to 5) of the scales consists of 134 statements about the frequency of occurrence of various behaviors (e.g., shares toy or possessions with other children). Parents were asked to rate the frequency of these behaviors as never occurring, sometimes occurring, often occurring, or almost always occurring. The BASC-2 PRS was administered as a measure of child behavioral problems. Standard scores were computed to indicate whether children's behaviors are *at-risk* or *clinically significant*. Internal consistency reliability coefficients for the BASC-2 PRS range from .85 to .93. Test retest reliability ratings range from .81 to .86. Parents completed the BASC-2 PRS at baseline and post-intervention for both studies.

The CBRS (Carta, 2006; Appendix L) was used to rate five dimensions of child behaviors observed during the free play observation at baseline and post-intervention for both studies. Children were rated on a 5-point Likert scale on the following constructs: engagement with toys or materials, appropriateness of attention seeking, response to caregiver's directions, response to caregiver's positive initiations or interactions, and general affect. These ratings were tallied to create a summary score of the child's engagement and responsiveness during the free play observation. Internal consistency for this measure is high ($\alpha = 0.81$; Carta et al, 2013).

Parental stress and depressive symptoms. The Parenting Stress Index/Short Form, Third Edition (PSI/SF-3; Abidin, 1995) is a parent self-report, 36-item questionnaire that quickly

screens for stress in the parent-child relationship. It is designed to identify degree of stress in the parent-child system. The PSI/SF yields a total stress score from three scales: Parental Distress, Difficult Child Characteristics, and Dysfunctional Parent-Child Interaction. Items are listed as statements (e.g., 'I expected to have closer and warmer feelings for my child than I do and this bothers me') and were rated by the parent on a 3-point Likert scale ranging from 'strongly agree' to 'strongly disagree.' The PSI/SF-3 has acceptable test-retest reliability (range .68 to .85) and internal consistency (range .80 to .91). The PSI-SF-3 was administered at baseline and post-intervention for both studies, as well as at the one-month follow-up for Study 2.

The Beck Depression Inventory-Second Edition (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item, self-report rating inventory that measures characteristic attitudes and symptoms of depression in individuals 13 years of age and older. The 21-items comprise statements related to symptoms corresponding to criteria for diagnosing depression. Each set of statements describe dispositions ranging from normal to increasingly more depressed, and are assigned points ranging from 0 to 3, with 0 representing the non-depressed response and 3 representing the highest degree of depressed disposition. The points from all of the items are summed to yield a total depression score ranging from 0 to 63. Total scores are grouped in ranges to indicate the severity of depression: a score ranging from 0 to 13 indicates no to minimal depression, 14 to 19 indicates mild depression, 20 to 28 indicates moderate depression, and 29 to 63 indicates severe depression. The BDI-II has acceptable test-retest reliability (.93) and internal consistency ($\alpha = .92$). The BDI-II was administered at baseline and post-intervention for both studies.

Implementation fidelity. The Computer-Based cPAT Family Coach Checklist was used to measure the fidelity of implementation of the intervention procedures during 20% of the intervention visits. An independent observer that was trained by the principle investigator to

conduct the fidelity measure watched video recordings of home visits. Training consisted of reviewing a copy of the fidelity checklist (Appendix M) with definitions and role-playing administration. The family coach was observed implementing the intervention with high fidelity (M = 96%, range 87% to 100%) across the intervention visits watched. The coach self-evaluated her own implementation fidelity using the checklist during and after each intervention visit for each family and rated her fidelity as high as well (M = 96%, range 87% to 100%). Additionally, the checklist documented the degree of coaching used during each intervention visit. For example, the checklist measured whether or not the coach provided prompts, feedback, and extra practice following specific performance criteria by the parent during practice. The checklist also provided a place for the coach to rate the degree to which the parent attended to the computer-based presentation and describe what the parent was doing instead.

Interobserver Agreement

Interobserver agreement (IOA) was calculated for the following measures: (a) Child Planned Activities Training Home Visitor Assessment Form, (b) Indicator of Parent Child Interaction-II (IPCI), and (c) Child Behavior Rating Scales (CBRS). For the cPAT HV assessment form, IOA was calculated across each family for 21% of the observation sessions in each condition (baseline, intervention, and post-intervention). For the IPCI and CBRS measures, IOA was calculated across each family for 50% of the free play observations at baseline and post-intervention. For cPAT, occurrence reliability was calculated by dividing the agreements by the total number of agreements and disagreements and multiplying by 100 (Poling, Methot, & LeSage, 1995). For the IPCI and CBRS, occurrence reliability was calculated ($\frac{\text{agreements}}{\text{agreements} + \text{disagreements}} \times 100$). Because the CBRS measure is an ordinal rating scale, agreement within 1 point was used as the expected criteria (Farran, Clark, & Ray, 1990).

Any rating differences greater than 1 point, was considered a disagreement. Reliability for all of the measures were scored from video recordings. IOA for the cPAT HV assessment form averaged 93.9% across all observations (range 80% to 100%), families (range 89.7% to 100%), and conditions (range 92.5% to 95.5%). IOA for the IPCI measure averaged 96.1% across all items (range 88.6% to 100%), families (range 94.2% to 99.2%), and conditions (range 95.5% to 97.5%). IOA for the CBRS measure averaged 94.3% across all items (range 85.7% to 100%), families (range 80% to 100%), and conditions (range 90% to 96%).

The principal investigator served as the primary observer and trained one secondary observer. The secondary observer was trained to a reliability criterion of 90% prior to independently scoring participant behavior for the cPAT HV assessment form, IPCI, and CBRS. The principal investigator provided a written copy of the observation protocols for both the IPCI and cPAT form to the observer to read. Afterwards, the observer took two written tests to demonstrate her basic knowledge on both protocols (see Appendix N for both quizzes). Each quiz was scored and missed questions were discussed with the observer. During this time, the CBRS definitions were reviewed and discussed as well; the definitions are included on the measure. Following the discussion, the observer scored training videos of parent-child interactions which were formatted the same as the participant videos: 5- to 10-minute observations of a parent and child during an activity. Disagreements were discussed following each scoring of a training video. Once the observer scored two consecutive videos with 90% agreement, training was complete.

Study 1: Effects of Computer-Based Pilot Presentation of Child Planned Activities Training (cPAT)

Participants were divided into two study groups. Study 1 tested the pilot presentation of the intervention with one family as a means of understanding the program's feasibility and usability, as well as feasibility of the intervention procedures and measurement protocols.

Experimental Design

An A-B design was used to evaluate the effects of the computer-based pilot study of Child Planned Activities Training (cPAT) with one mother-child dyad.

Independent Variable

Child Planned Activities Training (cPAT) is a skills-based parent training intervention that focuses on promoting positive parent-child interactions and preventing challenging child behavior across daily routines. Parents are taught strategies that provide structure to daily routines and set the occasion for appropriate child behavior. Additionally, parents are taught to focus on appropriate behavior by establishing simple rules in advance, providing praise and other positive consequences for such behavior, and ignoring minor misbehavior. When parents embed these strategies into daily routines, children learn what to expect and how to behave appropriately. cPAT consists of ten strategies that are divided into three areas: before the activity, during the activity, and at the end activity. Before the activity, parents are asked to (a) prepare in advance, (b) explain the activity, and (c) explain the rules and consequences. During the activity parents are taught to (d) talk about what they and their child are doing, (e) use good physical interactions skills, (f) give choices, (g) praise desired behaviors, (h) ignore minor misbehavior, and (i) provide consequences. Finally, at the end of the activity, parents are asked to (j) wrap-up and give feedback.

cPAT uses the same ten strategies to address most activities, with one exception. Strategies for independent play activities are modified because the parent is not interacting with the child during most of the activity. Similar to the interactive strategies, cPAT strategies for independent play are organized by what to do before, during, and at the end of the activity. Before the activity, parents are asked to (a) prepare in advance, (b) explain the activity, (c) explain the rules and consequences, and (d) select a short time period for the activity. During the activity parents are taught to (e) check on the child often, (f) ignore minor misbehavior, (g) handle disruptions, and (h) provide consequences. Finally, at the end of the activity, parents are asked to (i) wrap-up and give feedback and (j) spend individual time with their child (refer to Lutzker & Bigelow, 2002, for observational definitions of the cPAT strategies).

Typical delivery. cPAT is typically delivered face-to-face as a weekly home-based intervention, occurring over the course of six weeks. Typically, the first visit consists of baseline assessment of activities, with the intervention being introduced on the second visit. The last visit is an end-of-intervention assessment. In some cases, parents participate in one additional practice visit if they did not achieve success with the strategies in the end-of-intervention assessment. Each intervention visit consists of explanation, demonstration, and practice with constructive feedback on use of the cPAT strategies in a daily activity, starting with play. Free play is typically the first daily activity that is intervened upon because it is commonly an easy activity for the parent (e.g., little to no challenging behaviors from the child) and thereby allows the parent to practice the intervention strategies with greater ease. In the first visit, the home visitor explains the rationale and benefits of the program, describes the ten strategies in detail with the parent with rationales for their use, and then models the cPAT strategies during play with the child while the parent watches and asks questions. Following the model, the parent practices

using the cPAT strategies during that same play activity with their child. After the practice, the home visitor gives the parent positive and constructive feedback on their performance, and when necessary, engages with the parent in an “explain, model, practice, feedback” loop until the parent achieves mastery in the activity. Mastery is defined as demonstrating 100% of the strategies with consistency and ease. At this point, the home visitor and parent plan for how and when the parent will practice the activity on their own until the next visit. The next intervention visit starts with the parent demonstrating their use of the cPAT strategies during a play activity. Following the observation, the home visitor offers feedback. If needed, the home visitor will also engage with the parent in the “explain, model, practice, feedback” loop until the parent achieves mastery (100% of strategies demonstrated with consistency and ease) in the activity before moving on to the next focus activity.

Focus activities for the typical delivery of cPAT are informed by the parent’s responses on the Daily Activities Checklist (DAC). As previously mentioned, the first intervention visit addresses play. Once play is addressed, two daily activities that the parent has described as needing some degree of change are intervened upon in the next two subsequent visits. Independent play is addressed in the last intervention visit. Typically, cPAT home visits are about 60 to 90 minutes in duration.

Computer-based delivery. The cPAT intervention was modified for this study by using a computer-based format to explain and model the intervention strategies and prompt parent practice. These activities, normally conducted by the home visitor, were conducted in a computer-based format delivered using a series of four interactive Apple Keynote presentations that focused on four separate daily activities: play, mealtime, getting ready, and independent play (see Table 8 for a comparison of components in the typical delivery of cPAT as compared to the

computer-assisted delivery). Similar to the cPAT typical delivery, play is the first activity addressed in the computer-based delivery of the program. The parent watched the computer-based presentation for play that included: explanation of the rationale for cPAT and each of the ten strategies, two video model demonstrations of parents engaging in the strategies during a play activity with their child, and prompts to help the parent plan for practice (called “guided practice”). After the parent watched the computer-based presentation, the home visitor observed the parent practice of the cPAT behaviors and provided feedback and coaching as needed to support parents in achieving mastery (89% of strategies demonstrated correctly). Similar to the original intervention delivery, the computer-based delivery was designed such that subsequent daily activities were intervened upon once the 89% mastery criteria were met on the current focus activity. As compared to typical cPAT delivery, mastery criteria were lowered from 100% to 89% strategies demonstrated correctly for the computer-based delivery. When parents demonstrated 89% of the strategies correctly, they received corrective feedback for any strategies that were omitted or demonstrated incorrectly, but did not receive additional coaching through the “explain, model, practice, feedback” loop described earlier.

Also diverging from typical in-person delivery of cPAT, parents were not given a choice of daily activities to focus upon in the second and third intervention visits. Mealtime and getting ready were the only daily activities that were intervened upon in addition to play and independent play. Participants were given a choice of the order of presentation (e.g., whether or not to address mealtime or getting ready after play). Getting your child up in the morning, getting your child dressed, getting ready to leave the house, and bedtime/naptime were all addressed in the “Getting Your Child Ready for the Day and Night” presentation. Meal preparation was addressed in the “Keeping Your Child Engaged When You’re Busy” (independent play)

presentation. If parents identified activities in the “Other Activities” category of the DAC as needing a lot of change, these activities were addressed informally in the final visit. The length of computer-based cPAT visits were comparable to the length of typically delivered cPAT visits. The first intervention visit is longest, ranging from 60 to 90 minutes in length. The remaining visits averaged about 60 minutes in duration.

Procedures

Consent and daily activities checklist. The researcher met with the family at their home to obtain their informed consent for participating in the study. Once the family consented, the researcher reviewed the Daily Activities Checklist (DAC) with the family to determine which daily routines in which challenging child behavior occur, and thus, pose the greatest challenge to the parent. The parent identified two daily activities on which to focus in addition to play activity. Three activities were selected for intervention: free play, getting ready to go, and mealtimes. The parent did not rate any activities as needing “a lot of change.” As a result, two activities were selected that were rated as needing “some change.”

Also, during this initial visit, the purpose of the study was explained to the parent. The parent was told that as part of the pilot study (Study 1), she was helping test the feasibility and usability of the computer-based presentation, intervention procedures, and measurement protocols. The parent was told that “we’re not testing you; you’re testing us” in an effort to encourage frequent and honest feedback.

Baseline (A). During the baseline assessment, the parent completed the questionnaire (generated using Qualtrics software, Provo, UT) on the iPad Air 2. The questionnaire included demographic questions; questions about the mother’s use of technology; and three dependent variable measures that examined parent stress (PSI/SF-3), parent depressive symptoms (BDI-II),

and child behavioral problems (BASC-2 PRS). Once the questionnaire was complete, a subsequent visit was scheduled. At that visit, the mother was provided with instructions for engaging in the parent-child observation. The researcher requested that the mother engage with her child in three activities: free play with materials/activities of the parent or child's choosing that are located in the home, mealtime, and getting ready. The researcher stated that she would be observing how the parent interacts with her child during a variety of situations and instructed the parent to do whatever she would normally do during each activity, as if the researcher was not present. Each activity was observed for 5 to 10 minutes and recorded with the camcorder. The researcher thanked the parent for letting her observe the activities and told the parent that they would talk more about these activities over the next few visits. During these three activities, the researcher recorded the parent's use of cPAT strategies on the cPAT HV assessment form (one form was completed for each activity). Additionally, the recorded version of the free play activity was watched after the visit and coded for parent-child interaction skills and child behavior using the IPCI and CBRS dependent variable measures.

At the beginning of any baseline session, the camera was setup in the parent's living room on a small tabletop tripod in an effort to reduce potential reactivity and habituate the family to the recording equipment (Ostrov & Hart, 2013). However, during observations, it was sometimes necessary to move the camera around the room to adequately capture the parent and child interactions.

Intervention (B). Following the baseline observations, the Computer-Based Child Planned Activities (cPAT) intervention was introduced. The parent was given the cPAT Parent Manual binder, along with a brief overview of the materials included. The researcher also briefly described the process to the parent: the parent would watch a presentation on the computer and

then practice cPAT with her child in the activity that was discussed in the presentation. The participant was encouraged to talk aloud while she was going through the computer-based presentation so that the researcher could document any clarifications that were needed or aspects of the program that were problematic or confusing for her. She was encouraged to ask questions aloud but told that the questions might not be addressed until the end of the computer presentation.

After the participant watched the computer presentation, the family coach asked for and discussed any questions the participant had about the presentation content and then asked the participant if she was ready to practice. During the practice observation, the coach provided verbal prompting and additional feedback to the parent as needed and scored the parent's performance using the cPAT HV assessment form. After the observation, the coach gave the parent positive and constructive feedback on her performance, and when necessary, engaged with the parent in the "explain, model, practice, feedback" loop until the parent achieved mastery criteria of at least 89% of the strategies demonstrated correctly. If the parent scored 89% or above on the cPAT HV assessment form (that is, the parent demonstrated all but one of the strategies), the coach gave brief feedback regarding skill improvement and moved on. If the parent scored between 50% and 88% on the cPAT HV assessment form, the family coach engaged with the parent in the "explain, model, practice, feedback" loop until the mastery criterion was achieved. If the parent scored below 50% on the cPAT HV assessment form, the family coach would have engaged in the "explain, model, practice, feedback" loop and asked the parent to practice the entire activity again with the child. Parent practice performance on the cPAT HV assessment form never dropped below 80%; this level of repeat practice was not

required. After practice, the home visitor and parent planned for how and when the parent would practice cPAT within the activity on their own until the next visit.

The second intervention visit started with a parent-child observation, in which the parent demonstrated their use of the cPAT strategies during a play activity while the coach recorded the parent's correct implementation of the cPAT strategies with the cPAT HV assessment form. The parent did not receive any coaching during this assessment observation. Following the observation, the coach offered feedback in a manner similar to how feedback was offered after practice during the previous intervention visit. If the parent scored 89% or above on the cPAT assessment form, the coach gave brief feedback regarding skill improvement and moved on. If the parent scored between 50% and 88% on the cPAT HV assessment form, the coach engaged with the parent in the "explain, model, practice, feedback" loop until success was achieved with the parent practice portion limited to role-playing or giving examples of strategies. If the parent scored below 50% on the cPAT HV assessment form, the coach engaged in the "explain, model, practice, feedback" loop and requested that the parent repeat the entire computer-based presentation on use of cPAT during play activities again. Parent performance on the cPAT assessment form during all activities never dropped below 90%; intervention visits were not repeated.

Once feedback was given, the computer-based presentation for the next focus activity was introduced. Intervention visits followed a similar pattern: (a) each visit started with an observation of the focus activity from the previous week; (b) the parent received feedback on their performance; (c) the parent watched a computer-based presentation (either on a new activity or a repeated activity); and (d) the parent engaged in practice of the activity that was the

focus of the computer-based presentation. For the Study 1 family, three presentations were viewed in the following order: play, getting ready, and mealtimes.

During and immediately after each computer-based presentation, the coach recorded the parent's comments and questions about the presentation on the cPAT Computer-Based Pilot Evaluation Form in order to document issues that arose and clarifications that were needed. At the end of each visit, after practice was completed, the participant completed the cPAT Computer-Based Program Pilot Satisfaction Survey. The coach immediately reviewed the participant's responses and discussed them with her, along with any issues that were documented on the evaluation form (see Appendix O for a copy of this form). Feedback obtained from the parent informed revisions to subsequent visits.

As mentioned previously, at the beginning of any visit a camera was set up on a small tabletop tripod. The parent was recorded during the entire intervention visit including (a) during the activity assessment and feedback at the beginning of the visit, (b) while she was watching the computer-based presentation, and (c) during the activity practice and feedback at the end of the visit.

Post-intervention. Following the completion of the intervention, a post-intervention assessment was conducted. During the post-assessment intervention, the parent completed the post-assessment questionnaire (generated using Qualtrics software) on the iPad Air 2. The questionnaire included the cPAT satisfaction surveys and the three dependent variable measures that examined parental stress and depressive symptoms and child behavioral problems (BDI-II, PSI/SF-3, and BASC-2 PRS). Once the questionnaire was completed, a free-play activity observation was conducted and recorded. The coach recorded the parent's performance using the cPAT assessment form and provided positive and corrective feedback after the activity ended.

Due to a combination of weather-related issues, scheduling difficulties, and child-illnesses, only a play observation was completed as part of the post-intervention assessment.

Study 1 Results

The primary objective of Study 1 was to test a pilot presentation of the cPAT computer-based intervention in order to understand the program's feasibility and usability. Additional objectives included testing the feasibility of the intervention procedures and measurement protocols. The pilot family completed three intervention visits over the course of six weeks and tested computer-based presentations for three activities: play, getting ready, and mealtime. Intervention visit length ranged from 60 to 90 minutes, with the first visit lasting the longest.

Dependent Variables

Parent use of cPAT strategies. Figure 3 presents parent use of cPAT strategies in the pilot family before and after the computer-based cPAT intervention was introduced. At the initial baseline visit, three observations were conducted of three daily activities: play, getting ready, and mealtime. The parent demonstrated 33% of the cPAT strategies in each of those activities. The mean score for each of those observations ($M = 33\%$) is presented as the first data point on the graph (observation session 1). After the introduction of the computer-based cPAT intervention addressing play, the parent demonstrated 100% of the cPAT strategies in the next observation. The parent demonstrated 100% of the strategies for the remaining activities and observations as well (getting ready and mealtime). Following completion of the three intervention visits, play was observed at the post-intervention visit; the parent demonstrated 100% of the cPAT strategies during that observation as well.

Parent engagement in intervention activities. The average parent rating was 2.7 out of 3 on the Parent Engagement Rating Scale (PERS) for each intervention visit (range 2.8 to 2.5).

The average parent rating was 4.7 out of 7 on Scale 6 of the Home Visiting Rating Scales – Adapted and Extended (HOVERS-A+) for each visit (range 4 to 5).

Parent-child interaction skills. The Indicator of Parent Child Interaction (IPCI) was used to score 5-minute samples of baseline and post-intervention free play observations in order to assess parenting skills and parent-child interactions. Occurrences of positive parenting behaviors (i.e., parent acceptance and warmth, descriptive language, follows child’s lead, and maintains and extends child’s interest) were low at baseline (range from 10 to 30 percent of intervals observed). At post-intervention, occurrences of descriptive language increased from 30 to 70 percent of intervals observed, whereas occurrences of acceptance and warmth increased from 30 to 50 percent of intervals observed. Following child’s lead decreased slightly at post-intervention (from 50 percent to 40 percent) and maintaining and extending child’s interest remained the same from baseline to post-intervention (occurring during 10 percent of intervals). Occurrences of the negative parenting behaviors (i.e., uses criticisms or harsh tone of voice and uses intrusions or restrictions) were not observed at baseline or post-intervention.

Occurrences of positive child behaviors (i.e., positive social feedback, sustained engagement, and follow through on instructions) increased or remained high from baseline to post-intervention. Occurrences of positive social feedback increased from 30 to 40 percent of intervals at post-intervention, whereas follow through on instructions increased from 40 to 70 percent of intervals. Sustained engagement was observed as occurring during 100 percent of intervals at pre- and post-intervention.

Child behavior. At baseline, the parent rated her child’s behavior with the Behavior Assessment System of Children, Second Edition, Parent Rating Scales for preschool-aged children (BASC-2 PRS). Externalizing problems and internalizing problems composite *T* scores

were within the *clinically significant* range (67 and 73, respectively), whereas the behavioral symptoms index (BSI) composite score was within the *at-risk* range (BSI = 64). The adaptive skills composite score was 49 and within the *average/high* range (41 or higher). At post-intervention, the parent's ratings on the BASC-2 PRS decreased across each of the composite scores. Externalizing and internalizing composite scores decreased to 58 and 63, both within the *at-risk* range. The BSI score decreased to 54, which is considered *average*. The adaptive skills composite score decreased slightly to 47, which is still considered within the *average/high* range.

The child's engagement with toys, appropriateness of attention-seeking behavior, response to instructions, response to caregiver initiation, and general affect was rated by the researcher during free-play observations at baseline and post-intervention visits using the Child Behavior Rating Scales (CBRS). The rating scale ranged from 1 to 5, with 5 indicating the most positive or appropriate behavior. At baseline, child ratings ranged from 3 to 5 ($M = 4.4$), whereas post-interventions ratings ranged from 4 to 5 ($M = 4.8$). Ratings of the child's response to the caregiver's instructions and the child's response to the caregiver's positive physical and/or verbal initiations increased from baseline to post-intervention, whereas ratings of the child's appropriate seeking of attention decreased. Ratings of the child's engagement with toys and general affect did not change across the course of Study 1 and remained high.

Parental stress and depressive symptoms. The parent's baseline Beck Depression Inventory (BDI) was 17. Scores ranging from 14 to 19 indicate symptomology of mild depression. The parent had a total stress score between the 95th to 99th percentiles on the Parental Stress Index-Short Form 3 (PSI/SF-3), which falls within the *clinically significant* range of scores. At the post-intervention assessment, the parent's BDI score decreased to 13, which

indicates minimal to no depression symptomology. The parent's total stress score on the PSI/SF-3 also decreased to between the 75th to 80th percentiles, which is in the typical range.

Parent satisfaction and ease of use. Parent satisfaction and ease of use was assessed for each intervention visit and overall at the post-intervention visit. For satisfaction for each intervention visit, the pilot parent rated each computer-based presentation highly across each of the five areas included on the pilot satisfaction survey. The parent rated her overall reaction to the computer presentation (based on rating ranges of terrible to wonderful, difficult to easy, and dull to stimulating) between 6 and 7 out of 7 for each visit. The parent provided a rating of 7 out of 7 for each visit with regard to how easy the text was to read and the clarity and organization of the presentation. For overall satisfaction with the entire program, the pilot parent also rated her overall satisfaction with the intervention and computer-based delivery positively at post-intervention. With regard to program content and outcomes, she selected "Strongly Agree" for the majority of the statements on the cPAT program content and outcome satisfaction survey (11 out of 14 statements). The parent rated "Strongly Disagree" on the two statements that were that negatively worded (e.g., "I do not feel that this training gave me new or useful information or skills."). Lastly, she selected "Agree" for the statement that addressed her confidence in her ability to use the cPAT strategies with her child. With respect to overall satisfaction with the computer-based presentation, she rated "Strongly Agree" for 7 out of 8 statements and "Agree" for 1 statement.

Study 1 Discussion

The results of Study 1 indicated that the computer-based cPAT intervention was feasible to implement: all of the scheduled visits were completed, expected observations were made, and measures were administered as planned. Additionally, improvements in parent and child

behavior provide preliminary support for the potential effectiveness of the intervention in improving parent and child outcomes. These were promising results and provided support for further examination in Study 2.

Feedback from the pilot participant in Study 1 informed revisions to the computer-based presentation that would be evaluated in Study 2. Minor usability issues were corrected such as video volume and timing of slide transitions. Additional features were added to give users more navigation options throughout the presentation. For example, options were added to bypass the video replay of the first video model in each presentation. Once the initial video model was played in each presentation, the presentation then provided a summary slide of the ten strategies. On this slide, users were given the option to replay the narrated video, watch a shorter version of the same model without narration, or proceed directly to the quiz. Additions were also made to the guided practice portion of each presentation. Narration was added to explain how the parent should prepare for practice on their own and how practice should continue throughout the week until the next home visit.

Feedback from Study 1 also informed revisions to the intervention procedures. When parents do not frequently experience challenging child behavior during a given activity, they may not understand the benefit of describing rules and consequences at the beginning of that activity. The cPAT intervention is typically introduced initially in play activities because parents may be less likely to experience challenging behavior and more likely to be able to practice the strategies with ease in a less demanding situation. Parents may choose any play activity for practice and are not instructed on what types of play activities in which to engage with their child. In an effort to demonstrate to parents the benefit of explaining rules and consequences during activities, parents were asked to practice playing with play-dough with their child during the first intervention visit

because the activity calls for the need to set some boundaries around use of the dough and requires some kind of cleanup element. The researcher provided a bag to the family at the first intervention visit that included three different play-dough tubs and various tools for playing with the dough such as shape cutters, rolling pins, and scissors. Additionally, software updates and related issues dictated that the computer-based presentation would be presented on a laptop and not on a tablet, as was originally planned. Shortly before the intervention was introduced with the pilot family, Apple released software updates that changed the performance of the computer-based cPAT presentations on the tablet, causing the tablet to frequently shut down and restart. After multiple phone calls and visits with Apple support did not resolve the issue, the researcher decided to present the computer-based presentation to families on a laptop.

Study 2: Effects of a Modified Computer-Based Presentation of Child Planned Activities Training (cPAT)

Study 2 included six families and evaluated the effect of the revised computer-based intervention on parent and child outcome measures.

Experimental Design

A multiple baseline design across participants (Gast, Lloyd, & Ledford, 2018) combined with pretest and post-test measurement was used to evaluate the effects of the modified computer-based intervention as well as relations to ancillary measures of outcome. Participants were divided into two cohorts with three mother-child dyads per cohort. The intervention conditions were altered in the design as follows: A-B, where A = baseline (before intervention) and B = intervention (computer-based presentation of cPAT with coach feedback).

A multiple baseline design was chosen as an alternative to a reversal design because (a) the target behavior (parent use of cPAT strategies) was likely to be irreversible (Cooper, Heron,

& Heward, 2007). Multiple baseline designs across participants are used to compare baseline (A) and intervention (B) conditions at different points in time and for three or more participants. Rather than reversing a change with the first participant baseline, in multiple baseline designs the intervention is applied to one of the other unchanged participant baselines, thus replicating the A-B comparisons across participants. These A-B comparisons were not simple sequential duplications. Target behaviors across participants were measured concurrently with a time-lagged procedure applied to when the intervention condition began for each participant. Typically, time-lagged procedures result in baselines of varying lengths. When using a multiple baseline design, both sides of the correlation between intervention and behavior change should be observed: a) behavior change is observed with the application of the intervention and (b) no similar behavior change is evident in baselines where interventions have not been applied (Horner & Baer, 1978).

The following procedural guidelines were adhered to with respect to the design: (a) a minimum of five data points per phase were collected (b) a criterion of stability in all tiers for initial introduction of the intervention was determined; (c) a visual analysis criterion of a clear change in level with no overlapping data points with baseline was determined for introduction of the intervention for remaining tiers; (d) participants were randomized to tiers prior to the start of the study; (e) frequency of reliability and fidelity data collection were determined prior to the start of the study and data were collected for the duration of the study; and (f) data were collected at least once per week unless a participant was unable to meet due to illness or scheduling conflicts.

Each family remained in baseline until consistency of level, trend, and variability were observed through visual analysis of the data. Although data were collected at baseline at least

once during several daily activities including play, getting ready, mealtimes, independent play, and cleanup, only data collected on parent use of the cPAT strategies during play (recorded on the cPAT HV assessment form) were used to determine when the intervention would be introduced in the first daily activity (free play). Following the introduction of the intervention on free play, subsequent intervention visits focused on the three remaining daily activities assessed in baseline: getting ready, mealtime, and independent play. Once the parent reached a criterion level of 50% accuracy on the cPAT HV assessment form for the focus activity, a new activity was introduced. Although visual analysis of free play data was used to determine when the intervention was initially introduced, visual analysis of data for the subsequent focus activities was used to determine whether the parent would (a) move on to the next focus activity or (b) repeat the intervention visit with the current focus activity.

Independent Variable

A revised version of the cPAT computer-based presentation was used for Study 2, based on the findings from Study 1 described previously.

Procedure

The procedure for Study 2 was a slightly modified version of the procedure for Study 1. Parent ease of use and satisfaction was no longer assessed after each intervention visit; it was only assessed at post-intervention for Study 2.

Baseline (A). During the initial baseline visit, Study 2 participants completed the same questionnaire as described in Study 1. Once the questionnaire was complete, subsequent visits were scheduled to observe play and daily activities. During those visits, parents were observed interacting with their child in five activities (as compared to three in Study 1): free play, mealtime, getting ready to go out, independent play, and a cleanup activity. Participant

instructions similar to the ones stated in Study 1 were also stated in Study 2: the researcher would observe how the parent interacts with their child during a variety of situations. Each activity was observed for 5 to 10 minutes and recorded with the camcorder. Finally, the researcher thanked the parent for letting her observe their activities and said that they will talk more about these activities over the next few visits. During these five activities, the researcher recorded the parent's use of cPAT strategies on the cPAT HV assessment form (one form was completed for each activity). Additionally, after the visit was complete, the recorded version of the free play activity was viewed and coded for parent-child interaction skills and child behavior using the IPCI and CBRS dependent variable measures.

Play was observed at each baseline observation; other daily activities were observed at least once during baseline. When multiple activity observations occurred during the same observation session, the mean cPAT score was graphed. Parent implementation of the cPAT strategies in play activities during baseline were used to determine when the intervention was introduced.

Similar to the Study 1 procedure, a camera was setup in the parent's living room on a small tabletop tripod at the beginning of each session in order to capture parent and child behavior in order for reliability to be assessed and parent-child interaction skills and child behavior to be measured (using the IPCI and CBRS measures).

Intervention (B). Following baseline observation sessions, the Child Planned Activities Training (cPAT) intervention was introduced (see Table 9 for an overview of each cPAT intervention visit). At the beginning of the first intervention visit, program materials and expectations were briefly discussed. Parents were given the cPAT Parent Manual binder, along with a brief overview of the materials included; informed that each week they would watch a

presentation focusing on one daily activity and practice that activity with guidance from their coach; and told that each subsequent intervention visit would start with an observation of the activity they learned about previously. Once materials and expectations were reviewed, the parents watched the first computer-based presentation that introduced the cPAT strategies and focused on using those strategies during play activities. Following the computer presentation, the participant practiced using the cPAT strategies during play and the coach delivered feedback in the same manner that was described previously for Study 1.

Subsequent intervention visits followed a similar pattern until all intervention activities had been addressed: (a) each visit started with an observation of the focus activity from the previous week; (b) the parent received feedback on their performance; (c) the parent watched a computer-based presentation (either on a new activity or a repeated activity); and (d) the parent engaged in practice of the activity that was the focus of the computer-based presentation.

For the Study 2 participants, four computer-based presentations were viewed over the course of the intervention: play, getting ready, mealtimes, and independent play. The intervention started with the play presentation and ended with the independent play presentation for each family. Participants chose the order of the second and third intervention visit focus (e.g., whether or not they wanted to address getting ready or mealtimes first). During the final intervention visit, independent play was observed and assessed, along with a play assessment. If participants did not independently demonstrate at least 89% of the cPAT strategies during the play assessment, a booster visit was scheduled to give them another opportunity to practice before moving on to the post-intervention visit. Assessment of parent performance on the cPAT assessment form during the Intervention Visit 5 play observation never dropped below 89%. As a result, booster visits were not completed for any participant.

Parent behavior was recorded with the camcorder during the entirety of intervention visits including (a) during the activity assessment and feedback at the beginning of the visit, (b) while they were watching the computer-based presentation, and (c) during the activity practice and feedback at the end of the visit in order for fidelity to be monitored, reliability to be assessed, and parent-child interaction and child behavior to be measured (using the IPCI and CBRS measures).

Post-intervention. Following the completion of the intervention, parents completed the same post-intervention questionnaire that was administered in Study 1. Parents were then observed engaging with their child during the same five activities that were observed at baseline: free play, mealtime, getting ready, independent play, and a cleanup activity. The researcher recorded the parent's performance using the cPAT HV assessment form and provided positive and corrective feedback after all observations were completed. Additionally, following the visit, the recorded version of the free play activity was viewed and coded for parent-child interactions and child behavior using the IPCI and CBRS measures.

Study 2 Results

The primary outcome for Study 2 was to increase parent's use of cPAT strategies across routines through the introduction of the computer-based cPAT intervention. The research questions addressed several variables:

1. What are the effects on the computer-based version of cPAT on parent's use of cPAT strategies as compared to baseline?
2. What are the effects of the computer-based version of cPAT on parent generalization of cPAT strategies in an activity not addressed during the intervention as compared to baseline?

3. What are the effects of the computer-based version of cPAT on parent engagement in intervention activities?
4. What are the effects of the computer-based version of cPAT on parent ease of use and satisfaction with the program?
5. What are the effects of a computer-based version of cPAT on parent-child interaction skills as compared to baseline?
6. What are the effects of a computer-based version of cPAT on child behavior as compared to baseline?
7. What are the effects of a computer-based version of cPAT on parental stress and depressive symptoms as compared to baseline?

Five of the six families in Study 2 completed the study. One Cohort 2 family (Family 6) completed five intervention visits, but not the post-intervention visit. As a result, post-intervention data for parent satisfaction, parent-child interaction skills, child behavior, and parenting stress and depressive symptoms were not collected for this family.

Parent Use of cPAT Strategies

Figure 4 presents multiple baseline graphs of Cohort 1 parents' use of cPAT strategies across daily activities whereas Figure 5 presents multiple baseline graphs of Cohort 2 parents' use of cPAT strategies across daily activities. During baseline, intervention, and post-intervention, observations of two or more activities sometimes occurred during the same observation session. During baseline, play was observed at every session. The remaining intervention activities (mealtime, getting ready, and independent play) were also observed during baseline, but only one time and during the same observation when play was observed. During the final intervention visit (for independent play), observations of two activities were conducted:

independent play and play. Finally, all intervention activities (play, getting ready, mealtime, and independent play) were observed at the post-intervention visit. If more than one observation occurred during an observation session, the mean of those observations is presented on the multiple baseline graphs. For most families, the range of scores for each observation was close or equal to the mean score for all the observations. High-low lines have been added to the multiple baseline graphs to indicate the range of values for any mean presented on the graph (see Tables 10 and 11 for cPAT percentages recorded for each activity for Cohort 1 and 2 families).

For Cohort 1 families, baseline use of strategies was fairly stable when considering the mean percentage of strategies used for any activities that were observed during the same session. Additionally, baselines remained stable in each lower tier as the intervention was introduced in a higher tier. When considering the range of values for any mean presented on the graph, baseline data for Families 1 and 3 are more variable. For Family 1, variability was observed in play and non-play activities. Observations of play ranged from 11% to 33% ($M = 21.6$), whereas observations of non-play activities (i.e., getting ready, mealtime, independent play) ranged from 10% to 20% ($M = 17.3$). Baseline observations of play activities for Family 3 ranged from 22% to 40% ($M = 30$) and non-play activities ranged from 14% to 44% ($M = 32.7$). Although the band of variability is wider when considering the range of values presented for each observation session (as compared to the mean), the overall pattern is relatively flat. Once the intervention was introduced, increases in the use of cPAT strategies were immediate for all families. As intervention visits continued and the focus of cPAT changed from play to other activities (i.e., getting ready, mealtime, independent play), parent's use of cPAT varied but remained high and did not overlap baseline values. Increases in parent use of cPAT strategies in the generalization activity was observed across all Cohort 1 families.

Similar patterns were observed with Cohort 2 families. Baseline was fairly stable when considering mean percentages and remained stable in each lower tier as the intervention was introduced in a higher tier. When considering the range of values for any mean presented on the graph, baseline data for Family 4 were more variable. Variability in use of cPAT strategies by Family 4 during baseline was greatest for the three non-play daily activities. Observations of play during baseline remained stable and ranged from 33% to 44% ($M = 41.8$) during baseline, whereas observations of the non-play daily activities ranged from 12% to 50% ($M = 35.3$). Increases in the use of cPAT strategies were immediate for all families after the introduction of the intervention. As intervention visits continued and the focus of cPAT changed from play to other activities, parent's use of cPAT varied but remained high and did not overlap baseline values. Increases in parent use of cPAT strategies in the generalization activity increased for both families that completed intervention.

Figures 6 and 7 present parent's use of cPAT strategies in each daily activity at baseline and post-intervention for Cohort 1 and 2 families, respectively. These graphs illustrate that improvements in the use of cPAT strategies were observed in each of the four intervention activities as well as the generalization activity that was not addressed during intervention. These improvements were observed in each family that completed intervention.

Parent Engagement in Intervention Activities

Tables 12 and 13 present family coach ratings of parent engagement as measured by the Parent Engagement Rating Scale (PERS) and Scale 6 of the Home Visit Rating Scales – Adapted and Extended (HOVERS-A+) for both cohorts of families. For most families, engagement as rated on the PERS ranged from 2 to 3 (out of 3 possible) for most intervention visits. To earn this rating, families were consistently participating in discussions and practice of new strategies,

completing homework, and mastering current intervention visit strategies. If families started the program less engaged, they generally became more engaged in later visits. The PERS also tracked the number of times parents rescheduled intervention visits or were not home for scheduled visits (commonly referred to as a no-show). All of the parents rescheduled visits at some time during the intervention (ranging from 1 to 4 rescheduled visits per family). Mostly these visits were rescheduled to another time during the same week; five of the six parents rescheduled at least once to the following week. Parents typically rescheduled for reasons that were out of their control such as child or personal illness. Family 6 was the only parent who was not home for a scheduled visit (a no-show). Her average engagement rating across intervention visits on the PERS was 2.2 out of 3, indicating that she was at least somewhat engaged during visits.

Coach ratings of parent engagement in intervention activities on the HOVERS-A+ followed a similar pattern. If families were engaged at the beginning, they stayed engaged. If they were less engaged at the start of the intervention, they became more engaged by the end of the intervention. Ratings on the HOVERS-A+ for Cohort 1 families ranged from 3 to 6 and from 3 to 7 for Cohort 2 families (out of 7 possible). Higher ratings indicated higher frequency and consistency of parent interest in activities and materials, participation in activities, focus on topics, engagement and enthusiasm during interactions with their child, initiation in conversations, and proximity to child and family coach. A rating of 3 was considered adequate whereas a rating of 7 was considered excellent.

Parent Satisfaction and Ease of Use

Results from the Child Planned Activities Training Parent Satisfaction Survey for both cohorts are presented in Table 14. Parent satisfaction ratings for intervention content and

outcomes were high, with the exception of one item rating about the usefulness of the written materials (one parent did not rate this item highly). In addition to their high endorsements of the program, four participants added specific comments expressing their overall satisfaction: (a) “it was helpful to me,” (b) “I enjoyed learning about the strategies,” (c) “this is a great program which gave me an idea and steps to deal with my child,” (d) “I have learned so much from this program and I’d like to thank [family coach name] for being so helpful and patient with me and my son”.

Results from the Computer Presentation Satisfaction Survey for both cohorts are presented in Table 15. Parent satisfaction ratings for the computer-based presentation were mostly high indicating that the parents agreed that the presentation had clear objectives, presented the information clearly and was well-organized and easy to understand. Parents also rated the length as appropriate and the video examples and guided practice as helpful. Two items received a neutral rating by one parent: (a) the material was presented in an interesting manner and (b) I enjoyed watching and using the computer presentation.

Parent-Child Interaction Skills

Tables 16 and 17 present parent-child interaction skills as measured by the Indicator of Parent Child Interaction (IPCI) measure for Cohort 1 and Cohort 2 families at baseline and post-intervention. For Cohort 1, increases in parent following the child’s lead was observed for all families from baseline to post-intervention. Increases in child positive social feedback and sustained engagement were also observed across all families. Changes from baseline to intervention for the remaining IPCI caregiver and child items were not consistent across all families in Cohort 1. For example, increases in the occurrence of the use of descriptive language were observed in Families 1 and 3, whereas no changes were observed from baseline to

intervention in Family 2. Increases in occurrences of conveying acceptance and warmth were only observed in Family 2 as compared to slight decreases observed in Families 1 and 3. In Family 1 increases were observed in maintaining and extending child's focus whereas no changes were observed in Families 2 and 3. Increases were observed in child following through on instructions in Families 1 and 2, whereas slight decreases were observed in Family 3. Instances of caregiver interrupters (or negative parenting behaviors) and child distress were only observed in baseline in Family 1; occurrence of these behaviors decreased to zero at post-intervention.

For Families 4 and 5 in Cohort 2, increases in three parent items were observed from baseline to post-intervention: conveys acceptance and warmth, uses descriptive language, and follows child's lead. Increases in child follow through on instructions was also observed for both families. Observations of child sustained engagement increased for Family 4 from baseline to post-intervention, whereas observations started and remained at 100% for Family 5. Child positive social feedback remained stable and low for Family 4 from baseline to post-intervention whereas increases were observed for Family 5. Instances of caregiver interrupters and child distress were not observed at baseline or post-intervention for either family in Cohort 2.

Child Behavior

Tables 18 and 19 present parent reported child behavior ratings recorded with the Behavior Assessment System for Children, Second Edition Parent Rating Scale (BASC-2 PRS) and family coach ratings of child behavior on the Child Behavior Rating Scales (CBRS). For the BASC-2 PRS, increases in the parent ratings of child adaptive skills was observed across all five families that completed the intervention. Other changes were not systematic and varied by family. Family 1 parent ratings of child externalizing problems and behavioral symptoms

increased from *average* to *clinically significant* from baseline to post-intervention. Parent ratings of child externalizing problems in Families 2 and 5 decreased from *at-risk* to *average* from baseline to post-intervention.

Coach ratings of child behavior on the CBRS increased for all families in Cohort 1 and for Families 4 and 5 in Cohort 2 suggesting that the children became more engaged with toys, sought parent attention more appropriately, responded to instructions and parent physical and verbal initiations more frequently, and improved in their general affect from baseline to post-intervention. Baseline CBRS ratings for Cohort 2 families ranged from 2.6 to 4.2 out of 5 possible ($M = 3.2$); post-intervention ratings increased to 5 for each family. CBRS ratings for Family 4 in Cohort 2 improved from 3.8 at baseline to 5 at post-intervention whereas ratings for Family 5 improved from 4 to 5.

Parental Stress and Depressive Symptoms

Parenting stress scores measured with the Parenting Stress Index/Short Form – Third Edition (PSI/SF-3) are presented for Cohorts 1 and 2 in Tables 20 and 21, respectively. For Cohort 1 parents, total stress percentiles were low at baseline and remained low at post-intervention. However, changes in subscale percentile scores varied for each family. The Parent-Child Dysfunctional Interaction (P-CDI) subscale percentile score increased from *average* at baseline to *clinically significant* at post-intervention for Family 1. For Family 2, P-CDI subscale scores decreased from *clinically significant* at baseline to *average* at post-intervention. The P-CDI subscale score for Family 3 also decreased from baseline to post-intervention but remained within the *average* range each time. For Cohort 2, systematic changes in parenting stress were not observed. For Family 4, total parenting stress and parenting stress subscale percentiles scores were *clinically significant* at baseline and remained *clinically significant* at post-intervention,

with the exception of the P-CDI subscale which decreased to the *typical* range. Family 5 parenting stress percentile scores remained low at baseline and post-intervention.

Mothers' depression scores as measured by the Beck Depression Inventory – Second Edition (BDI-II) are presented in Table 22 for both cohorts. Overall, mothers' BDI scores were low for most families at baseline (e.g., none to minimal symptomology of depression) and remained low at post-intervention. Family 4 was the only family with a BDI score at baseline that indicated mild depression. At post-intervention, her BDI score decreased to the 'no to minimal' range for depression.

Discussion

The purpose of this study was to evaluate the effects of a computer-based version of Child Planned Activities Training which combines computer-based tutorials with in-home coaching on parent use of intervention strategies, parent-child interaction skills, and child behavior. The overall results of these studies support the use of this computer-based intervention in combination with in-home coaching in improving parents' use of the cPAT strategies and consequently improving parent-child interaction skills and child behavior.

Data from the multiple baseline design across participants, illustrating parent use of cPAT strategies, show that all six parents increased their use of the strategies during daily activities with their children. Immediate increases in parent use of cPAT strategies were observed across participants in both cohorts upon introduction of the intervention and parent use of strategies remained high throughout intervention without overlapping parent use of strategies observed during baseline. Additionally, parent use of cPAT strategies during the activity that was not addressed during intervention (cleanup) also increased from baseline to post-intervention. Thus, in answer to the first and second research questions, observed increases in parent use of the

cPAT strategies during the intervention activities and the cleanup activity appear to support the effectiveness of the computer-based cPAT intervention with coaching in increasing parent use of cPAT strategies across daily activities addressed and not addressed by the intervention.

The third research question explored the effects of the computer-based cPAT and coaching intervention on parent engagement in intervention activities. One concern with implementing a computer-based format is that the loss of in-person interactions with the coach could considerably weaken parents' engagement with and understanding of the material. Such interactions typically provide the opportunity for explanation and clarification of the materials or allow for modifications in the instruction to fit the needs of the learner (Feil et al., 2008). Parent engagement appeared to follow one of two patterns during the intervention. If families were engaged at the beginning of intervention, they remained engaged. If they were less engaged at the start of the intervention, they became more engaged by the end of the intervention. These results are promising and provide preliminary support for the ability of the computer-based cPAT program to promote sustained parent engagement. However, because parent engagement was rated by the family coach, and was not assessed for interobserver agreement, these results must be interpreted with caution.

The mostly positive parent satisfaction ratings with both the (a) content and outcomes of the cPAT intervention and (b) organization and ease-of-use of the computer-based presentation address the fourth research question with regard to the effects of the intervention on parent satisfaction. Parents' acceptance of the goals, procedures, and outcomes of the intervention suggest that the intervention would be accepted and viable if implemented in a community setting and provide support for the social acceptance of the intervention. These are important considerations for the social validity of the intervention (Foster & Mash, 1999). The neutral

ratings endorsed by two parents with regard to the enjoyment and interest level of the computer-based presentation suggest that more work is needed with regard to the overall design of each presentation. For example, the length of the first computer-based presentation is forty minutes long and includes one video that is viewed twice: once with narrated explanations of each demonstrated strategy and once without the narrated explanations. While completing her satisfaction survey, one parent commented that the first intervention visit was “long but necessary” and explained that she rated the survey question as neutral due to those reasons.

The fifth research question addressed effects of the computer-based version of cPAT on parent-child interaction skills. Differences were observed in parent-child interactions from baseline to post-intervention across all families who completed the study but varied in magnitude and consistency with respect each IPCI item and each family. Increases in following the child’s lead was observed from baseline to post-intervention across all five families who completed the study, but those increases were relatively small for two families. Although teaching parents how to follow their child’s lead was not explicitly addressed during the course of the intervention, some of the cPAT strategies such as talking about what you and your child are doing promote the type of positive interactions that are defined as following the child’s lead. As a result, it seems likely that instances of following the child’s lead would improve as a function of the intervention. Increases in the use of descriptive language were observed for four parents, whereas increases in conveying acceptance and warmth were observed for three parents. Increases in child behavior measured by the IPCI were observed in all families but inconsistently across different variables. For example, increases in positive social feedback and follow through on instructions were observed for four children. Increases in sustained engagement were

observed for three children whereas child sustained engagement were observed at 100% from baseline to post-intervention for two families.

Baseline and post-intervention differences in child appropriate behavior and behavioral problems were observed with both the BASC-2 and CBRS, suggesting that, with respect to the sixth research question, improvements in parent use of cPAT strategies may have contributed to improvements in child appropriate behavior, as well. Ratings of child engagement and behavior during free play, as measured by the CBRS increased from baseline to post-intervention for all families. This suggests improvements in parent use of cPAT strategies that resulted from the intervention may have contributed to increases in child affect, engagement with toys, appropriate initiations, and response to instructions and other verbal or physical initiations made by the parent.

Results for the BASC-2 ratings were more mixed than the consistent changes observed with the CBRS ratings. Overall, parent ratings of child adaptive skills on the BASC-2 increased from baseline to post-intervention indicating that children's adaptability to changes in the environment, social skills, and functional communication improved. These results are consistent with the Lefever et al. (2017) study that evaluated the effects of a cell phone-enhanced version of cPAT. It seems unlikely that these changes occurred solely as a result of child maturation during the two and half months the parents participated in the study; but due to the limitations of the design and frequency of data collection for the child variables, it is impossible to rule out maturation as a possible explanation for these changes. Only two families reported decreases in child challenging behavior on the BASC-2 from baseline to post-intervention. One family, Family 1, reported increases in child challenging behavior from baseline to post-intervention. As with maturation effects, it is impossible to rule out history effects as a possible reason for these

changes. Anecdotal evidence lends further support for this conclusion. At the start of study, the parent expressed the desire to enroll her child in a local pre-K program and described challenges that were preventing her from enrolling him. One challenge was the need for medication for the child's attention deficit disorder (ADD). As the mother explained it, she was told she could not enroll her son in pre-K until he was medicated. As a result of this conversation, the family coach referred the mother to a local intake and referral program that connects families to community resources, anticipating that they could help enroll her son in a pre-k program regardless of his medication status. During the course of the intervention, the child was evaluated for ADD and medication was prescribed. The parent had some difficulty filling the prescription (e.g., local pharmacy was out of stock of the medication). Prior to the post-intervention visit and to the difficulty getting the prescription filled, the mother commented that her child would be behaving better at the next visit because he would be medicated. When the mother completed the BASC-2 at the post-intervention visit, she expressed frustration that she was still unable to get the prescription filled. As stated above, this anecdote lends support for possible history effects that were contributing to parent reported changes in challenging child behavior. It also lends support for the need for observations of child behavior throughout baseline and intervention in order to more fully understand the effect of the intervention, and parent use of cPAT on child behavior.

Finally, while some studies evaluating cPAT delivered in the context of a larger home-based parenting intervention (such as SafeCare) found decreases in parental stress following completion of the program (Chaffin et al., 2012), differences in parenting stress were not necessarily expected as a function of the current intervention. Discernable decreases from baseline to post-intervention were not observed. Computer-based cPAT was not a comprehensive intervention aimed at addressing the multiple stressors that influence the lives of parents

experiencing multiple risk factors. Had the intervention addressed multiple issues such as social support, financial matters, and other parenting concerns, it might be expected that improvements in these results from baseline to post-intervention would be possible.

These findings contribute to the existing body of literature on the use of a technology-based interventions for teaching positive parenting skills to families from low-income backgrounds with preschool-aged children. Of the studies reviewed that evaluated technology-driven interventions used to teach positive parenting skills to parents from low-income backgrounds (Baggett et al., 2010, 2017; Breitenstein & Gross, 2013; Sheeber et al., 2012), three included direct observational measures of parent outcomes (Baggett et al, 2010, 2017; Sheeber et al., 2012). Of those three studies, only one study recruited mothers of preschool-aged children (Sheeber et al., 2012). Although Sheeber and colleagues evaluated an intervention with positive parenting components, the primary purpose of the intervention was to provide cognitive behavioral therapy for depression as compared to improving positive parenting skills, which is the primary purpose of the cPAT intervention. Additionally, the findings support the use of technology-based versions of cPAT in improving parent use of cPAT strategies, as well as parent and child behavior. It expands the body of research evaluating technology-driven versions of cPAT by incorporating computer-based technology (as compared to the video-based version evaluated by Lutzker and Bigelow, 1998).

Limitations

There are several limitations to consider with respect to the dependent variables, experimental design, study procedures, and independent variable.

Dependent variables. The cPAT HV assessment form included quality indicators (using a *check* or *check plus*) to categorize the strength of the demonstration of each cPAT strategy. For

example, the form instructs the observer to score a *check plus* for any strategy if the parent “demonstrated the behavior consistently and with ease.” Observers should score a *check* for any strategy if the parent “needs improvement in ease and/or consistency of the behavior.” For the purposes of evaluating parent use of cPAT strategies for these studies, both *check* and *check plus* scores were treated as a correct demonstration of the strategy and were tallied in the same way. If parents correctly demonstrated 50% to 100% of the cPAT strategies (regardless of whether items are scored as *check* or *check plus*), they were allowed to move on to the next activity. The *check/check plus* quality indicator was used by the coach for determining when a parent needed additional coaching or feedback. For example, if a parent gave a positively stated rule and a negative consequence (i.e., you need to stay at the table; if you don’t stay at the table, I will take the play-dough away) during assessment, this was scored as demonstrating the strategy correctly. Following the activity, coaching was provided (e.g., explain, model, practice, feedback loop) on use of positive rules and positive consequences (e.g., you need to stay at the table; as long as you stay at the table, you continue to play with the play-dough). The nature of the intervention allowed parents to continue to review and practice the strategies at each visit. Although new activities were addressed from visit to visit, the same set of strategies were used. Future research is needed to examine patterns of generalization and maintenance as a function of whether parents primarily received *check* or *check plus* scores during observation sessions. The lack of one-month follow-up data for each of the families to determine if parent use of cPAT strategies was maintained is a limitation of the study.

Prior to these studies, the IPCI was used in several research studies with children between the ages of 2 and 42 months and their caregivers. Typically, the IPCI is administered for ten minutes across four activities or tasks: free play, looking at books, distraction, and dressing. For

ease of incorporating the measure into the existing daily activity observations for the cPAT intervention, only five minutes of free play were observed. It is possible that the ability of the IPCI to sensitively measure parent-child interaction skills of the parents and children in these studies were limited by (a) the changes to the administration of the measure and (b) use of it with an older population of children. The focus of the IPCI on behaviors that indicate the quality of the interaction and are predictive of social-emotional outcomes in young children ages 2 to 42 months make it a promising measurement tool (Baggett, Carta, & Horn, 2009). More validation of the measure is needed with preschool populations of children (i.e., 3-5 years of age) and with varying time-samples (e.g., 5-minutes, 10-minutes, 15-minutes).

Experimental design. The purpose of Study 2 was to evaluate the effect of the computer-based cPAT intervention on parent use of cPAT strategies, parent-child interaction skills, and child behavior using a concurrent multiple baseline design across participants. The results are promising and demonstrate a functional relationship between the intervention and parent use of cPAT strategies for the families in Study 2. The concurrent and continuous measurement of the dependent variable and time-lagged application of the intervention across participants used with multiple baseline designs typically result in baselines of varying lengths. Families 2, 3, and 5 experienced delays starting baseline observations due to scheduling conflicts and child illnesses and their baselines did not vary in length from previous participant baselines (or tiers). Application of the intervention for these families followed the guidelines described previously in the method for Study 2, when: (a) a minimum of five observations were collected and (b) visual analysis criterion (a clear change in level with no overlapping data points in baseline) in the previous participant baseline was met. Although the baselines did not vary in length, the time-lagged application of the intervention still allowed for comparisons between

participants and both sides of the correlation between intervention and behavior change were observed: (a) change occurred when the intervention was applied and (b) when the intervention was not applied, change did not occur (Horner & Baer, 1978). A review of the baseline observation protocol did not indicate any reason, other than the introduction of the intervention that could be attributed to the immediate increase in parent use of cPAT strategies across all participants. However, because the baseline lengths did not vary in frequency of data points, the opportunity to demonstrate continued stable responding in lower tiers after the intervention was applied to higher tiers was limited to one or two data points. As a result, conclusions that parent use of cPAT strategies changed when the intervention was applied and did not change *until* the intervention was applied are weakened (Cooper, Heron, & Heward, 2007). Additionally, these results do not confirm that are technology-based interventions are effective with families in general. Larger-scale replication in community-based settings with a randomized controlled trial is needed to make broader conclusions about the effectiveness and generalizability of this program.

Procedures. Future examination is needed to explore the influences of the intervention procedures on the parent and child outcomes. For example, the presence of the observer, recording with the video camera, and requests for the parent to play or interact with their child may have influenced how the parent interacted with their child during the activity observations. For example, all of the parents sat with their children during mealtime observations. Although they all stated that they typically stay with their children during this activity, the extent to which the family coach's presence and the recording of the interaction altered the interaction in some way is unknown. Additionally, during the independent play observation, the family coach stayed with the child while the parent was away. Although the family coach did not interact with the

child during these observations, their presence may have altered the behavior of some children and perhaps made them less likely to seek out their parent.

Baseline and intervention observations varied slightly from post-intervention observations. Typically, in baseline and intervention, discrete observations of daily activities took place one at a time with a clear start and stop to each activity. During intervention, the parents learned the strategies by activity: first play, followed by getting ready to go out and mealtime, and finally independent play. Although the computer presentation in the first intervention visit discussed how parents' days are an ongoing series of activities, the act of using the cPAT strategies throughout this series of activities, across transitions, was never addressed, practiced, or observed until the post-intervention visit. At the beginning of the post-intervention assessment visit, the agenda was discussed (e.g., "Today, I will be observing these five activities: play, cleanup from play, getting ready, mealtime, and independent play") and then parents were asked to choose the activity in which they wanted to start. The post-intervention visit was most likely more realistic to the day-to-day series of activities that each of the parents experienced regularly than any other observation. However, as a result, the use of cPAT strategies may have decreased from activity to activity because the parents were experiencing the observation as one long activity (e.g., they offered several choices or already explained the rules and consequences) or the parents were not in the practice of using the cPAT strategies during a series of activities.

When routines or interactions are altered by the presence of observers, recording equipment or the nature of the observation itself (e.g., engaging in one discrete activity at a time), parents may not receive the benefit of practicing and demonstrating these strategies in naturalistic ways. This has potential implications for the generalization and maintenance of the target behaviors to truly naturalistic settings (i.e. without a coach or observer present). Again, the

lack of follow-up data to examine maintenance of cPAT strategies is a limitation of Study 2.

Future studies should examine generalization to untrained activities, and the maintenance of any observed improvements over time.

The generalizability of the results from Study 2 may be influenced by a number of factors. In order to recruit, retain, and engage families, parents were compensated for their time and engagement in the study. Cash payments averaged \$12 per visit for most families, including baseline, intervention, and post-intervention visits and were offered in lump sums of \$30 at baseline and \$90 at post-intervention. Additionally, parents and children could select one small \$1 to \$5 personal item or toy for themselves at each visit, which increases the average compensation to \$22 per visit. It is unknown to what extent the compensation impacted parent engagement and retention in the computer-based cPAT intervention. Home visiting research programs with at-risk families indicate that maintaining the active engagement of families, regular adherence to home visit schedules, and family retention in the program are common challenges (Holland, Christensen, Shone, Kearney, & Kitzman, 2013). However, programs do not typically compensate families for their participation (Gross et al., 2011). With respect to delivering the computer-based cPAT intervention within the larger context of community-based home visiting programs, generalization of the findings of these studies may be impacted due to lack of financial compensation.

Another issue relevant to generalizability is the manner in which the presentation was implemented during home visits. The family coach provided a computer for families to complete the computer-based presentation at each visit. Although most of the parents reported comfort using technology and owned devices on which to access a computer-based program (all parents owned either a computer or a tablet), not all parents had reliable access to the Internet. Three

parents relied on data plans from their cellular provider and two of those three parents indicated occasional challenges with data shortages. Future research should focus on identifying the barriers to successful implementation, such as internet connectivity, as well as the ways in which these barriers impact parent and child outcomes.

Independent variable. Unlike the typical delivery of cPAT, the computer-based version was not individualized and may not have addressed the specific activities or child behavior for which parents wanted support. For example, three parents rated shopping and running errands as an activity that needed change on the Daily Activities Checklist. Using cPAT during activities that were not addressed during the computer-based presentation was discussed with each family during the final intervention visit, but they did not have the benefit of watching modeled demonstrations of those activities or practice and feedback. Future iterations of the computer-based cPAT program should include a broader set of daily activities from which parents can select for each intervention visit's focus.

Future iterations of the computer-based cPAT program should also include more diverse representations of parents, children, child behavior, and parent homes in the video models. The majority of the participants were people of color (5 out of 7), whereas only 2 out of 8 of the video models included people of color. Those two video models were recorded with a Latinx mother and child whereas participants included an African American mother and children of mixed race. The majority of the children in the video models engaged in little to no minor misbehavior or challenging behavior. The homes depicted in the video models differed from the participants' homes with regard to the space and the furnishings, and potentially highlighted income or class differences. It will be important that future iterations of the cPAT presentation

represent wider variation in families with different demographic characteristics and from diverse backgrounds.

Future Directions

Future research directions might include scaling and dissemination of the program into a format that community-based parenting intervention providers could incorporate into ongoing home visiting programming. A larger scale replication of the study would contribute by making the intervention more broadly acceptable to larger audiences and the results more generalizable. When examining the dissemination of cPAT, it would be important to explore and understand modifications that might be needed to facilitate its adoption by community-based programs and how the cPAT strategies can best be implemented with parenting programs that focus on broader challenges faced by families such as child maltreatment, drug abuse, and intimate partner violence.

The focus of future research might also include evaluation of the computer-based cPAT model when accessed via the Internet, where parents access the intervention independently or within the context of home visiting. An Internet-based version of cPAT could address implementation challenges faced by traditional delivery methods by promoting greater participant access, and thus potentially engagement in intervention activities and maintaining treatment fidelity. For example, an Internet-based format can provide standardized discussion and models of target behaviors, in conjunction with individualized parent coaching. Additionally, an Internet-based platform for cPAT has implications for wider access and dissemination whereas the current study does not impact wider access to the cPAT intervention. Evaluations of Internet-based cPAT could include an examination of the feasibility and effectiveness of remote coaching (using videoconference technology) as compared to in-person coaching in improving

parent use of the cPAT strategies and identification of the barriers to successful implementation such as Internet connectivity.

The relative impact of technology-delivered interventions as compared to in-person interventions, and the cost effectiveness of technology-based interventions (Hall & Bierman, 2015) should also be examined in future research. The current studies show that the technology-based version of cPAT is feasible, but it will be important to further examine the intervention when delivered in the context of community-based home visiting programs. The acceptability (as rated by home visiting staff and parents), impact on parent engagement, retention, and parent and child outcomes should be examined. More evaluation is needed to determine the relative impact of technology-based interventions, and to determine if any decrease in impact is offset by improved accessibility or cost effectiveness (Hall & Bierman, 2015).

Conducting further studies that examine the components of the intervention in order to fully understand the active ingredients for successful parent and child outcomes is also important. For example, examining the acceptability of technology-based interventions across parents of varied education, income, and risks would provide a more thorough understanding of the generalizability of the findings. Although acceptability was examined in both of these studies with families from low-income backgrounds, it is unknown to what extent the computer-based cPAT intervention would be acceptable with the larger population of families facing similar stressors and risks. Differences in instructional design and the impact on parent outcomes should also be examined. In their review, Hall and Bierman (2015) found that technology-based interventions and information seeking may have greater appeal to higher income, well-educated parents, and less to lower income, highly stressed, or less well-educated parents. However, they also found that interventions that have been blended to incorporate technology along with

communication supports from professionals, instructional design features that enhance interactivity, and audio and visual displays may assist low-literacy parents. Other studies that relied on technology-based delivery, but without communication with personal contacts often struggled to keep parents engaged, and experienced high non-completion rates. Further research is needed to understand challenges related to family engagement as a function of technology-based interventions, the conditions under which technology-based interventions are most effective, and how they can be integrated with face-to-face intervention delivery and coaching options. For example, evaluation of coaching and the role coaching plays in improved outcomes would be another component to explore.

Finally, the rapid pace of new technology development and dissemination should be considered when developing and testing technology-based interventions (Hall & Bierman, 2015). Research findings are quickly outdated as new technologies enter the field. It is important to anticipate emerging trends and understand issues of accessibility and acceptability of different modalities. Other important considerations to be addressed include ethical questions related to the use of technology-based interventions pertaining to participant confidentiality, Health Insurance Portability and Accountability Act (HIPAA) compliance, privacy, and online security.

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Table 1.

Quantitative Summary of Reviewed Studies Organized by Category and Type of Technology

Category	Value	All Technology	Enhanced with Technology	Delivered with Technology
Studies focusing on technology-based interventions for improving parent knowledge and/or attitudes	Count	24	5	19
	%	11	4	23
Studies focusing on technology-based interventions for teaching a broad variety of parenting skills	Count	25	12	13
	%	11	9	15
Studies focusing on technology-based interventions for teaching parent-child interaction skills	Count	174	122	52
	%	78	88	62
Total number of studies reviewed	Count	223	139	84
	%	100	62	38

Note. Reported percentages are calculated from the total number of studies reviewed across all categories ($n = 223$). E.g., $(24 \div 223) \times 100 = 11\%$

Table 2.

Research Questions, Related Dependent Variables, and Administration Time Points

Research Question	Instrument	Administration Time Points
1. What are the effects of the computer-based version of cPAT on parent's use of cPAT strategies as compared to baseline (business as usual)?	<ul style="list-style-type: none"> cPAT Home Visitor Assessment Form 	Baseline Throughout intervention (5 weekly visits) Post-intervention
2. What are the effects of the computer-based version of cPAT on parent generalization of cPAT strategies in an activity not addressed during intervention as compared to baseline?	<ul style="list-style-type: none"> cPAT Home Visitor Assessment Form 	Baseline Post-intervention
3. What are the effects of the computer-based version of cPAT on parent engagement and intervention completion?	<ul style="list-style-type: none"> Parent Engagement Rating Scale Home Visit Ratings Scales (HOVERS-A+) 	Throughout intervention (5 weekly visits)
4. What are the effects of the computer-based version of cPAT on parent ease of use and satisfaction with the program?	<ul style="list-style-type: none"> cPAT Parent and cPAT Computer Presentation Satisfaction Surveys 	Post-intervention
5. What are the effects of a computer-based version of cPAT on parent-child interaction skills as compared to baseline?	<ul style="list-style-type: none"> Indicator of Parent Child Interaction (IPCI) 	Baseline Post-intervention
6. What are the effects of a computer-based version of cPAT on child behavior as compared to baseline?	<ul style="list-style-type: none"> Behavior Assessment Scale for Children, Parent Rating Scales (BASC-2 PRS) Child Behavior Rating Scales (CBRS) 	Baseline Post-intervention
7. What are the effects of a computer-based version of cPAT on parental stress and depressive symptoms as compared to baseline?	<ul style="list-style-type: none"> Parenting Stress Index-Short Form (PSI/SF-3) Beck Depression Inventory (BDI-II) 	Baseline Post-intervention

Table 3.

Mothers' Demographic Information

Dyad	Age	Race	No. of children	Relationship status	Employ.	Highest grade completed	Dual-language.
Pilot	31	Hispanic/ Latinx	3	Married/with partner	No	11 th grade	Yes
Family 1	30	Caucasian	2	Married/with partner	No	HS dipl./ GED	No
Family 2	33	Hispanic/ Latinx	4	Divorced	Yes	Some college	Yes
Family 3	29	Asian	1	Married/with partner	Yes	Some college	Yes
Family 4	34	Caucasian	2	Married/with partner	No	Bachelor's degree	No
Family 5	28	Hispanic/ Latinx	3	Married/with partner	No	HS dipl./ GED	Yes
Family 6	24	Black/ African American	1	Single	No	HS dipl./ GED	No

Table 4.

Summary of Behavior Management Strategies Reported by Parents (n = 7)

Behavior Management Strategy	Number of Parents Who Reported Using Strategy
Using praise	4
Giving rewards	6
Setting rules	7
Setting logical consequences	5
Time-out	7
Spanking	1
Physical restraint	1
Grounding	3
Going to bed early	5
Talk to child about behavior	7
Yelling	3
Limiting privileges	5
Distraction	1

Table 5.

Parent Ratings of Frequency and Manner of Technology Use

	<i>M</i>	<i>SD</i>
Texting	3.86	1.21
Emailing	4.29	0.76
Browsing the Internet	4.29	0.95
Accessing social media	4.67	0.52
Playing games	2.67	1.86
Watching videos	3.33	1.51

Note. Parents rated the frequency of engaging in these behaviors on a scale from 1 to 5, with 1 representing never and 5 representing daily.

Table 6.

Parent Ratings of Confidence Using Technology

	<i>M</i>	<i>SD</i>
I feel comfortable using Smartphone	4.57	0.53
I feel comfortable using iPad	4.14	1.46
I feel comfortable using computer	4.71	0.49
I have good computer skills	3.71	0.95
I'm comfortable learning and working with new technologies	4.29	0.76

Note. Parents rated these statements on a scale of 1 to 5, with 1 representing strongly disagree and 5 representing strongly agree.

Table 7.

Administration Time Points for Each Dependent Variable Measurement

Baseline	Intervention	Post-intervention
<ul style="list-style-type: none"> • cPAT Home Visitor Assessment Form • Child Behavior Rating Scales • Beck Depression Inventory • Parenting Stress Index – Short Form • Behavior Assessment Scale for Children, Parent Rating Scales 	<ul style="list-style-type: none"> • cPAT Home Visitor Assessment Form • Parent Engagement Rating Scale • Home Visit Ratings Scales (HOVERS-A+) – Parent Engagement During Home Visit • cPAT Family Coach Checklist (fidelity) 	<ul style="list-style-type: none"> • cPAT Home Visitor Assessment Form • Child Behavior Rating Scales • Beck Depression Inventory • Parenting Stress Index – Short Form • Behavior Assessment Scale for Children, Parent Rating Scales • cPAT Parent Satisfaction Survey • cPAT Computer Presentation Satisfaction Survey

Table 8.

Comparison of Child Planned Activities Training (cPAT) Typical Delivery to Computer-Based Delivery

	Who Performs Task	
	Typical Delivery	Computer-Based Delivery
1. Sets agenda with parent	Family Coach	Family Coach
2. Conducts cPAT observation and provides positive descriptive praise and prompts skills needing improvement afterwards	Family Coach	Family Coach
3. Additional modeling, practice, and feedback as needed	Family Coach	Family Coach
4. Reviews progress since last visit	Family Coach	Family Coach
5. Inquires about cPAT practice since last visit and provides positive feedback	Family Coach	Family Coach
6. Provides intro and rationale for cPAT	Family Coach	Computer Presentation
7. Provides brief description of cPAT behaviors for the visit's relevant focus activity	Family Coach	Computer Presentation
8. Models cPAT and highlights specific strategies as they are demonstrated	Family Coach	Computer Presentation
9. Quizzes parents understanding of cPAT behaviors demonstrated in the video model	Not performed in typical delivery	Computer Presentation
10. Prompts parent to practice cPAT	Family Coach	Computer Presentation
11. Provides prompts as needed (during parent practice)	Family Coach	Family Coach
12. Following practice, provides positive, descriptive praise and instructions regarding strategies needing improvement	Family Coach	Family Coach
13. Additional modeling, practice, feedback, as needed	Family Coach	Family Coach
14. Specific plan with parent for practice before next visit, suggesting specific strategies to focus on	Family Coach	Family Coach
15. Summarize and conclude visit	Family Coach	Family Coach

Table 9.

Description of Computer-Based Child Planned Activities (cPAT) Intervention Visits

Visit	Intervention Activities
1	<p>Introduced Using cPAT During Play</p> <ul style="list-style-type: none"> • Parent watched computer presentation for play • Parent practiced cPAT strategies during play routine • During practice, family coach prompted the parent as needed. • Following practice, family coach engaged in explain, model, practice, feedback loop as needed until parent reached mastery (89% of strategies demonstrated correctly).
2	<p>Assessment of Previous Visit Activity</p> <ul style="list-style-type: none"> • Play observation. Following observation, family coach engaged in explain, model, practice, feedback loop as needed until parent reached 89% mastery criterion. <p>Introduced Using cPAT During DA 1 (mealtime or getting ready)</p> <ul style="list-style-type: none"> • Parent watched computer presentation for mealtime or getting ready • Parent practiced cPAT strategies during mealtime or getting ready routine • Family coach engaged in explain, model, practice, feedback loop as needed until parent reached 89% mastery criterion
3	<p>Assessment of Previous Visit Activity</p> <ul style="list-style-type: none"> • Getting ready or mealtime observation. Following observation, family coach engaged in explain, model, practice, feedback loop as needed until parent reached 89% mastery criterion. <p>Introduced Using cPAT During DA 2 (mealtime or getting ready)</p> <ul style="list-style-type: none"> • Parent watched computer presentation for mealtime or getting ready • Parent practiced cPAT strategies during mealtime or getting ready routine • Family coach engaged in explain, model, practice, feedback loop as needed until parent reached 89% mastery criterion.
4	<p>Assessment of Previous Visit Activity</p> <ul style="list-style-type: none"> • Getting ready or mealtime observation. Following observation, family coach engaged in explain, model, practice, feedback loop as needed until parent reached 89% mastery criterion. <p>Introduced Using cPAT During Independent Play</p> <ul style="list-style-type: none"> • Parent watched computer presentation for independent play • Parent practiced cPAT strategies during mealtime or getting ready routine • Family coach engaged in explain, model, practice, feedback loop as needed until parent reached 89% mastery criterion.
5	<p>Assessment of Previous Visit Activity</p> <ul style="list-style-type: none"> • Independent play observation. Following the observation, family coach engaged in explain, model, practice, feedback loop as needed until parent reaches 89% mastery criterion. • Play observation. If parent did not demonstrate 89% mastery criterion, a booster visit was scheduled to review the cPAT strategies before intervention was wrapped-up. <p>cPAT Intervention Wrap-Up</p> <ul style="list-style-type: none"> • If parent reached 89% mastery criterion during play, Daily Activities Checklist was reviewed for any remaining activities that needed addressed and those activities were discussed.

Note. If parent demonstrated less than 50% of the cPAT strategies correctly during any assessment, the previous Intervention visit was repeated. Parents could repeat up to two visits if needed.

Table 10.

Parent Use of cPAT Strategies Observed at Each Observation Session for Cohort 1 Families

Observation Session	Family 1		Family 2		Family 3	
	Activity	% cPAT	Activity	% cPAT	Activity	% cPAT
1	Play	20				
	Mealtime	20				
	Independent Play	22				
	Mean	21				
2	Play					
3	Play	33	Play	44		
	Getting Ready	10	Mealtime	44		
	Mean	22	Independent Play	17		
			Mean	35		
4	Play	11	Play	44	Play	30
			Getting Ready	40		
			Mean	42		
5	Play	22	Play	44	Play	40
					Independent Play	14
					Mean	27
6	Play	80	Play	40	Play	22
7	Getting Ready	70	Play	44	Play	33
					Getting Ready	40
					Mealtime	44
					Mean	39
8	Mealtime	78	Play	89	Play	33
9	Play	89			Play	100
	Independent Play	89				
	Mean	89				
10	Play	89	Mealtime	100	Getting Ready	80
	Getting Ready	80				
	Mealtime	90				
	Independent Play	90				
	Mean	87				
11			Getting Ready	89	Mealtime	100
12			Play	100	Play	100
			Independent Play	100	Independent Play	80
			Mean	100	Mean	90
13			Play	100	Play	89
			Getting Ready	78	Getting Ready	100
			Mealtime	100	Mealtime	89
			Independent Play	78	Independent Play	90
			Mean	89	Mean	92

Note. cPAT = Child Planned Activities Training

Table 11.

Parent Use of cPAT Strategies Observed at Each Observation Session for Cohort 2 Families

Observation Session	Family 4		Family 5		Family 6	
	Activity	% cPAT	Activity	% cPAT	Activity	% cPAT
1	Play	44			Play	33
2	Play	44			Play	33
3	Play	44	Play	22		
	Independent Play	12	Mealtime	40		
	Mean	28	Mean	31		
4	Play	33	Play	33	Play	33
	Getting Ready	44			Getting Ready	44
	Mealtime	50			Independent Play	38
	Mean	42			Mean	38
5			Play	22		
			Getting Ready	33		
			Independent Play	33		
			Mean	29		
6	Play	44	Play	33	Play	22
					Mealtime	33
					Mean	28
7	Play	100	Play	33	Play	30
8	Mealtime	89	Play	78	Play	30
9	Getting Ready	100	Getting Ready	89	Play	80
10	Play	100	Mealtime	100	Mealtime	80
	Independent Play	100				
	Mean	100				
11	Play	100	Play	100		
	Getting Ready	90	Independent Play	100		
	Mealtime	80	Mean	100		
	Independent Play	88				
	Mean	90				
12			Play	89		
			Getting Ready	100		
			Mealtime	100		
			Independent Play	100		
			Mean	97		
13					Getting Ready	67
14					Play	89
					Independent Play	100
					Mean	95

Note. cPAT = Child Planned Activities Training

Table 12.

Average of Family Coach Ratings of Parent Engagement Measured by the Parent Engagement Rating Scale (PERS) for Cohort 1 and 2 Families

Intervention Visit	Family 1	Family 2	Family 3	Family 4	Family 5	Family 6
Visit 1: Play	2.1	3.0	2.6	3.0	2.7	1.9
Visit 2: Daily Activity 1	2.0	3.0	2.8	2.6	2.8	1.9
Visit 3: Daily Activity 2	2.1	3.0	2.4	2.8	3.0	2.9
Visit 4: Independent Play	2.8	3.0	2.3	2.9	3.0	1.9
Visit 5: Wrap-Up	3.0	3.0	2.7	2.5	3.0	2.5
All Visit Average	2.4	3.0	2.5	2.8	2.9	2.2

Note. Parent engagement in intervention activities was rated with the PERS across a 3-point Likert scale. Intervention Visits 2 and 3 focused on two daily activities: getting ready and mealtime. The order of introduction varied across families. Some families started with mealtime as the focus of Intervention Visit 2 whereas other families started with getting ready.

Table 13.

Family Coach Ratings of Parent Engagement in Intervention Activities Measured by the Home Visit Rating Scales—Adapted and Extended (HOVRS-A+) for Cohort 1 and 2 Families

Intervention Visit	Family 1	Family 2	Family 3	Family 4	Family 5	Family 6
Visit 1: Play	3	5	4	5	4	4
Visit 2: Daily Activity 1	3	6	6	6	4	4
Visit 3: Daily Activity 2	3	6	6	6	6	4
Visit 4: Independent Play	4	6	4	7	6	3
Visit 5: Wrap-Up	4	6	6	7	6	4
All Visit Average	3.4	5.8	5.2	6.2	5.2	3.8

Note. Parent engagement in intervention activities was rated with the HOVERS-A+ across a 7-point Likert scale. Intervention visits 2 and 3 focused on two daily activities: getting ready and mealtime. The order of introduction varied across families. Some families started with mealtime as the focus of Visit 2 whereas other families started with getting ready.

Table 14.

Summary of Parent Responses on Child Planned Activities Training Parent Satisfaction Survey: Number of Parents Endorsing Each Rating (n = 5)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Interacting with my child has become easier.	2	3			
2. I have more ideas about activities I would like to do with my child.	3	2			
3. Routine activities, like feeding my child and bathing him/her, have become easier.	2	3			
4. I believe that this training would be useful to other parents.	4	1			
5. I feel confident in my ability to use the cPAT strategies with my child.	3	2			
6. I do not feel this training gave me new or useful information or skills.					5
7. Practicing during the sessions was useful.	3	2			
8. The written materials were useful.	3	1		1	
9. The home visitor was on time to appointments.	4	1			
10. The home visitor was warm and friendly.	4	1			
11. The home visitor was negative and critical.					5
12. The computer presentation was good at explaining the material.	3	2			
13. I plan to continue using the cPAT strategies with my child.	4	1			
14. Overall, I am satisfied with the cPAT program and my experiences with the program.	3	2			

Table 15.

Summary of Parent Responses on Computer Presentation Satisfaction Survey: Number of Parents Endorsing Each Rating (n = 5)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The objectives of the computer presentations were clear.	3	2			
2. The computer presentations were well-organized.	3	2			
3. The material was presented in an interesting manner.	3	1	1		
4. The information was clearly presented and easy to understand.	3	2			
5. The video examples were helpful in demonstrating the cPAT strategies.	3	2			
6. The length of the computer presentation was appropriate.	3	2			
7. The guided practice as the end of each computer presentation was helpful for preparing me to practice using the cPAT strategies with my child.	3	2			
8. I enjoyed watching and using the computer presentation.	3	1	1		

Table 16.

Cohort 1 Parent-Child Interaction Skills Recorded with the Indicator of Parent Child Interaction (IPCI) Measure

IPCI Item	Percentage of Occurrence of IPCI Items During 5-Minute Partial Interval Recording					
	Family 1		Family 2		Family 3	
	Pre	Post	Pre	Post	Pre	Post
Caregiver Facilitators						
1. Convey acceptance and warmth	20%	10%	30%	70%	60%	50%
2. Uses descriptive language	30%	40%	50%	50%	70%	100%
3. Follows child's lead	10%	20%	30%	40%	60%	100%
4. Maintains or extends child's focus	0%	10%	10%	10%	20%	20%
Caregiver Interrupters						
1. Uses criticism or harsh voice	30%	0%	0%	0%	0%	0%
2. Uses restrictions or intrusions	70%	0%	0%	0%	0%	0%
Child Engagement						
1. Positive social feedback	10%	30%	0%	70%	0%	20%
2. Sustained engagement	0%	80%	40%	90%	100%	100%
3. Follow through on instructions	20%	60%	0%	50%	30%	20%
Child Distress						
1. Irritable, fuss, cry	10%	0%	0%	0%	0%	0%
2. External distress (tantrum)	0%	0%	0%	0%	0%	0%
3. Frozen, watchful, withdrawn	0%	0%	0%	0%	0%	0%

Table 17.

Cohort 2 Parent-Child Interaction Skills Recorded with the Indicator of Parent Child Interaction (IPCI) Measure

IPCI Item	Percentage of Occurrence of IPCI Items During 5-Minute Partial Interval Recording					
	Family 4		Family 5		Family 6	
	Pre	Post	Pre	Post	Pre	Post
Caregiver Facilitators						
5. Convey acceptance and warmth	20%	80%	20%	60%	50%	-
6. Uses descriptive language	40%	100%	20%	70%	20%	-
7. Follows child's lead	50%	100%	50%	100%	50%	-
8. Maintains or extends child's focus	0%	60%	10%	0%	20%	-
Caregiver Interrupters						
1. Uses criticism or harsh voice	0%	0%	0%	0%	0%	-
2. Uses restrictions or intrusions	0%	0%	0%	0%	0%	-
Child Engagement						
4. Positive social feedback	10%	10%	40%	70%	60%	-
5. Sustained engagement	50%	100%	100%	100%	60%	-
6. Follow through on instructions	30%	70%	30%	40%	60%	-
Child Distress						
4. Irritable, fuss, cry	0%	0%	0%	0%	0%	-
5. External distress (tantrum)	0%	0%	0%	0%	0%	-
6. Frozen, watchful, withdrawn	0%	0%	0%	0%	0%	-

Note. Post-intervention data was not collected for Family 6.

Table 18.

Cohort 1 Ratings of Child Behavior Recorded with the Behavior Assessment System for Children, Second Edition Parent Rating Scales (BASC-2 PRS) and Child Behavior Rating Scales (CBRS) Measures

Scale	Ratings of Child Behavior at Pre- and Post-Intervention					
	Family 1		Family 2		Family 3	
	Pre	Post	Pre	Post	Pre	Post
BASC-2 Composite Scales						
Externalizing Problems						
<i>T</i> Score	45	77	60	46	43	46
(90% Confidence Interval)	(45-50)	(72-80)	(55-60)	(41-51)	(37-49)	(40-52)
Percentile Rank	35	98	85	41	25	40
Internalizing Problems						
<i>T</i> Score	33	45	43	36	42	50
(90% Confidence Interval)	(27-39)	(39-51)	(37-49)	(30-42)	(36-48)	(44-56)
Percentile Rank	2	32	25	6	20	54
Behavioral Symptoms Index						
<i>T</i> Score	52	74	45	37	44	44
(90% Confidence Interval)	(48-56)	(70-78)	(41-59)	(33-41)	(40-48)	(40-48)
Percentile Rank	64	98	34	7	30	29
Adaptive Skills						
<i>T</i> Score	29	30	58	63	57	62
(90% Confidence Interval)	(18-28)	(25-35)	(53-63)	(58-68)	(53-61)	(58-66)
Percentile Rank	1	3	78	91	75	88
CBRS						
Averaged Rating Across Five Dimensions	2.8	5.0	2.6	5.0	4.2	5.0

Note. BASC *T* score values were derived from parent ratings of child behavior; scores ranging from 20-59 for externalizing, internalizing, and behavioral symptoms composite scales are considered low to average, whereas values ranging from 60-69 are considered at risk. *T* score values ranging 70 or higher are considered clinically significant. BASC *T* score values ranging from 41 or higher for adaptive composite scales are considered average to high; scores ranging from 10-40 are considered low. CBRS scores were derived from observer ratings of child behavior on 5-point Likert scale with 5 representing the most appropriate or positive level of behavior.

Table 19.

Cohort 2 Ratings of Child Behavior Recorded with the Behavior Assessment System for Children, Second Edition Parent Rating Scales (BASC-2 PRS) and Child Behavior Rating Scales (CBRS) Measures

Scale	Ratings of Child Behavior at Pre- and Post-Intervention					
	Family 4		Family 5		Family 6	
	Pre	Post	Pre	Post	Pre	Post
BASC-2 Composite Scales						
Externalizing Problems						
<i>T</i> Score	61	65	60	54	55	-
(90% Confidence Interval)	(55-66)	(60-70)	(55-65)	(49-59)	(49-61)	-
Percentile Rank	35	98	85	41	25	
Internalizing Problems						
<i>T</i> Score	53	53	38	50	80	-
(90% Confidence Interval)	(47-59)	(47-59)	(32-44)	(44-56)	(74-86)	-
Percentile Rank	67	67	9	52	99	
Behavioral Symptoms Index						
<i>T</i> Score	62	61	57	50	58	-
(90% Confidence Interval)	(58-66)	(57-65)	(53-61)	(45-53)	(54-62)	-
Percentile Rank	88	87	78	54	81	
Adaptive Skills						
<i>T</i> Score	34	37	42	55	55	-
(90% Confidence Interval)	(29-39)	(32-42)	(37-47)	(50-60)	(51-59)	-
Percentile Rank	7	10	19	67	69	
CBRS						
Averaged Rating Across Five Dimensions	3.8	5.0	4.0	5.0	4.6	

Note. BASC *T* score values were derived from parent ratings of child behavior; scores ranging from 20-59 for externalizing, internalizing, and behavioral symptoms composite scales are considered low to average, whereas values ranging from 60-69 are considered at risk. *T* score values ranging 70 or higher are considered clinically significant. BASC *T* score values ranging from 41 or higher for adaptive composite scales are considered average to high; scores ranging from 10-40 are considered low. CBRS scores were derived from observer ratings of child behavior on 5-point Likert scale with 5 representing the most appropriate or positive level of behavior. Post-intervention data was not collected for Family 6.

Table 20.

Cohort 1 Parenting Stress Scores Rated with the Parenting Stress Index/Short Form - Third Edition (PSI/SF-3)

Scales and Subscales	Percentile Scores of Range of Scores Obtained at Pre- and Post-Intervention	
	Pre	Post
Family 1		
Total Stress	1	10
<i>Subscale Scores</i>		
Parental Distress (PD)	20	60
Parent-Child Dysfunctional Interaction (P-CDI)	55	85
Difficult Child (DC)	10-15	55
Family 2		
Total Stress	1-5	5
<i>Subscale Scores</i>		
Parental Distress (PD)	35	5
Parent-Child Dysfunctional Interaction (P-CDI)	85-90	5-10
Difficult Child (DC)	30-35	1-5
Family 3		
Total Stress	10	10-15
<i>Subscale Scores</i>		
Parental Distress (PD)	50	60
Parent-Child Dysfunctional Interaction (P-CDI)	55	25
Difficult Child (DC)	25-30	20-25

Note. Percentile scores that fall between 15 and 80 are considered typical. High stress scores range from 81 to 84 for the P-CDI subscale and between 81 and 89 for all the other subscales. Percentile scores that indicate clinically significant levels of stress are above the 85th percentile for P-CDI and above the 90th percentile for all of the other subscales.

Table 21.

Cohort 2 Parenting Stress Scores Rated with the Parenting Stress Index/Short Form - Third Edition (PSI/SF-3)

Scales and Subscales	Percentile Scores Obtained at Pre- and Post- Intervention	
	Pre	Post
Family 4		
Total Stress	95-99	95-99
<i>Subscale Scores</i>		
Parental Distress (PD)	90-95	80
Parent-Child Dysfunctional Interaction (P-CDI)	95-99	99+
Difficult Child (DC)	99+	99+
Family 5		
Total Stress	15	60
<i>Subscale Scores</i>		
Parental Distress (PD)	20	20
Parent-Child Dysfunctional Interaction (P-CDI)	95	20-25
Difficult Child (DC)	55-60	25
Family 6		
Total Stress	35	-
<i>Subscale Scores</i>		
Parental Distress (PD)	30	-
Parent-Child Dysfunctional Interaction (P-CDI)	80	-
Difficult Child (DC)	50	-

Note. Percentile scores that fall between 15 and 80 are considered typical. High stress scores range from 81 to 84 for the P-CDI subscale and between 81 and 89 for all the other subscales. Percentile scores that indicate clinically significant levels of stress are above the 85th percentile for P-CDI and above the 90th percentile for all of the other subscales. Post-intervention data was not collected for Family 6.

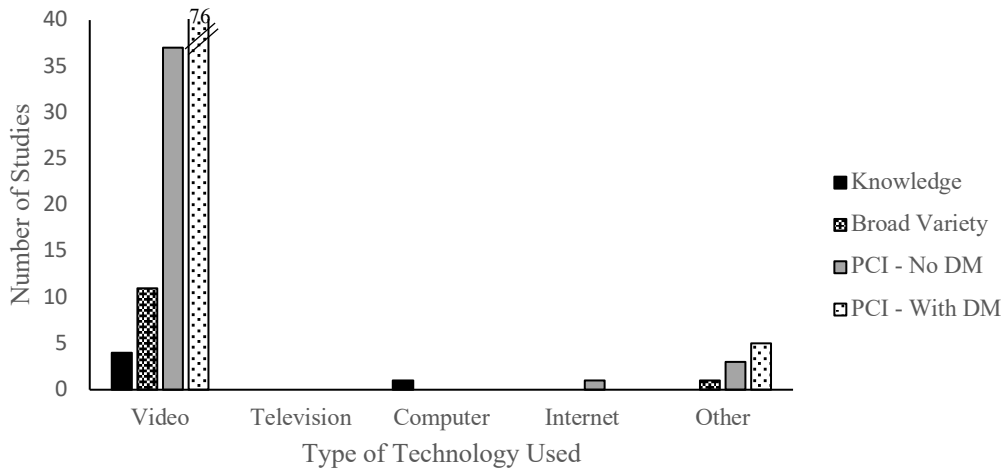
Table 22.

Cohort 1 and 2 Mothers' Depressions Scores Rated with the Beck Depression Inventory - Second Edition (BDI-II)

Family	Scores Obtained at Pre- and Post-Intervention	
	Pre	Post
Family 1	2	5
Family 2	0	0
Family 3	1	0
Family 4	18	8
Family 5	7	8
Family 6	0	-

Note. BDI scores ranging from 0-13 indicate no to minimal depression and scores from 14-19 indicate mild depression. BDI scores from 20-28 indicate moderate depression whereas scores from 29-63 indicate severe depression. Post-intervention data was not collected for Family 6.

Technology-Enhanced Parent Training Programs



Technology-Delivered Parent Training Programs

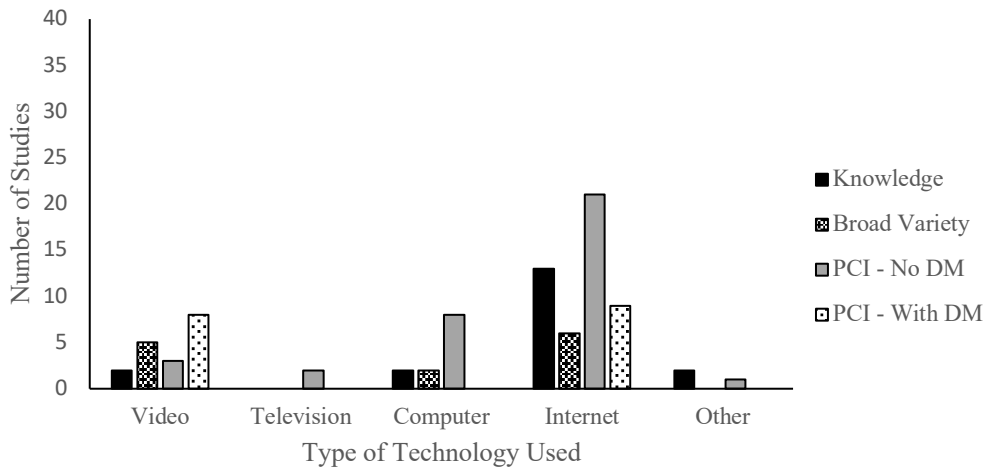


Figure 1. Comparison of number of technology-enhanced parent training studies to number of technology-delivered parent training studies. Studies are organized by the focus of the parenting intervention evaluated and the types of technology used (video, television, computer, Internet, or other). The focus of the parenting intervention is divided by those focusing on improving parent knowledge (Knowledge), teaching a broad variety of parenting skills (Broad Variety), and teaching parent-child interactions skills (PCI). PCI – No DM refers to parent-child interaction interventions that did not include direct measures. PCI – With DM refers to parent-child interaction interventions that included direct measures. Other refers to interventions that evaluated other technology formats such as smartphones, cell phones, digital frames, or videoconference platforms.

Evaluation of a Computer-Based Version of Child Planned Activities Training (cPAT)

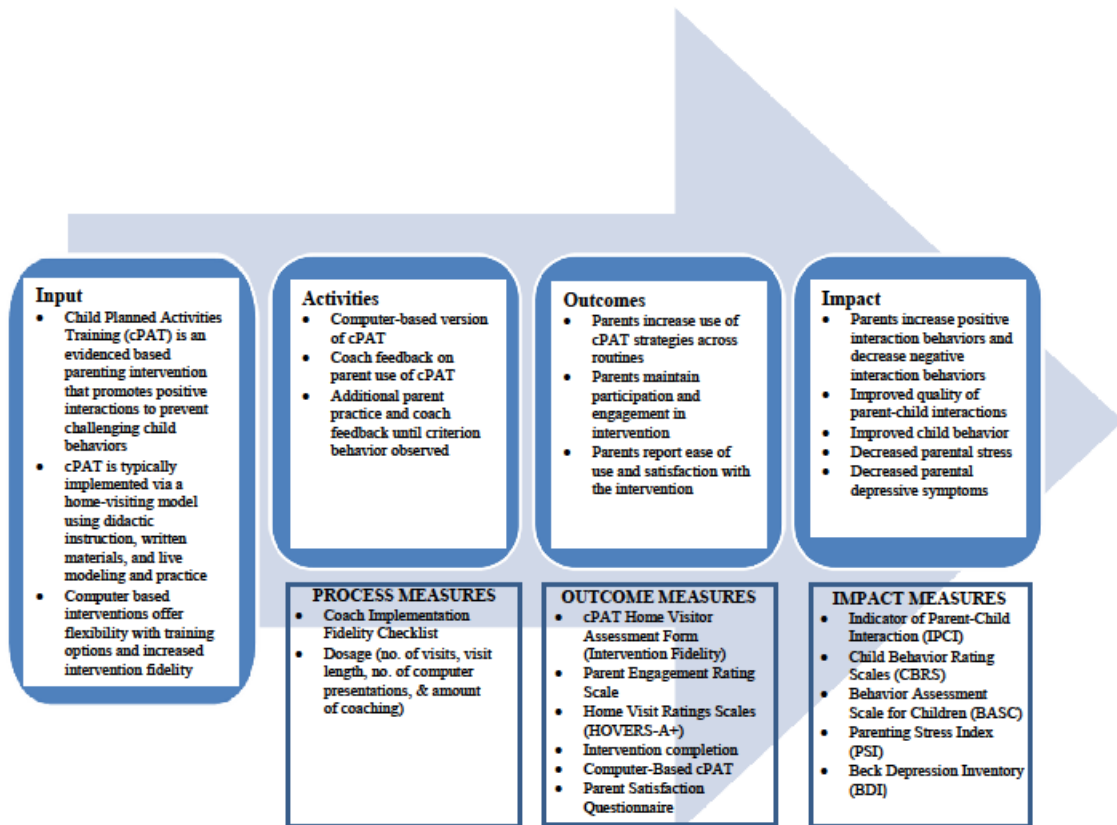


Figure 2. Theory of change model.

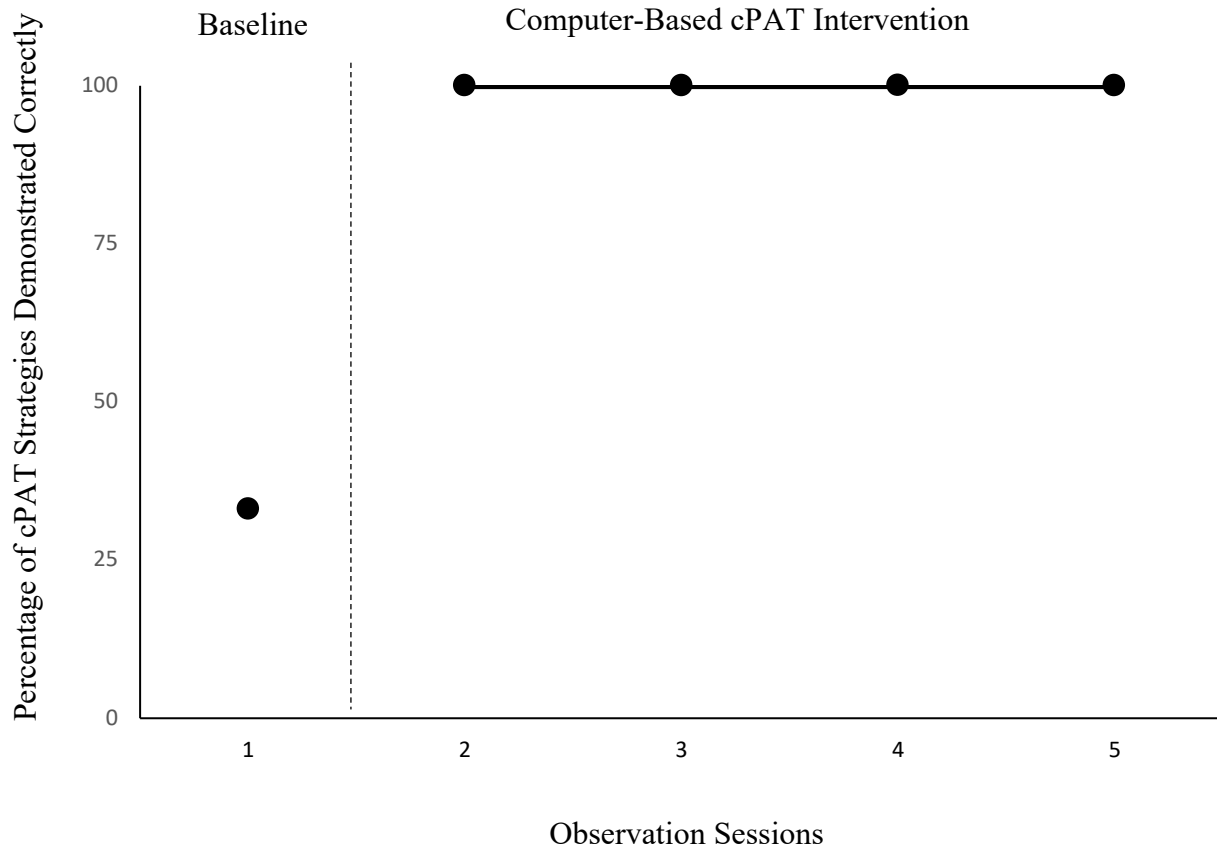


Figure 3. Percentage of cPAT strategies demonstrated correctly across daily activities in the pilot family in Study 1.

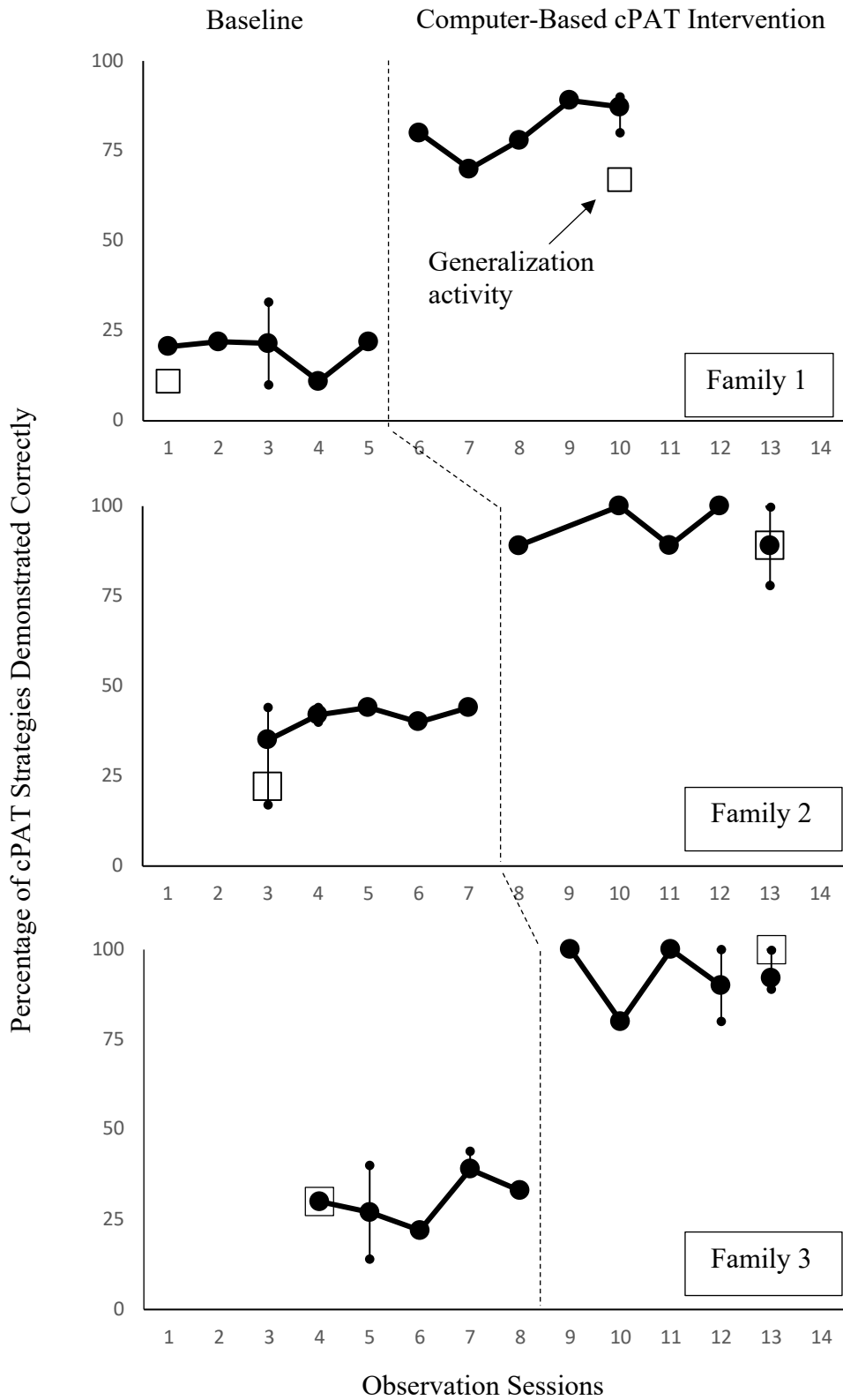


Figure 4. Percentage of cPAT strategies demonstrated correctly across daily activities and a generalization activity in Cohort 1 families in Study 2. High-low lines indicate the range of values for any mean presented on the graph.

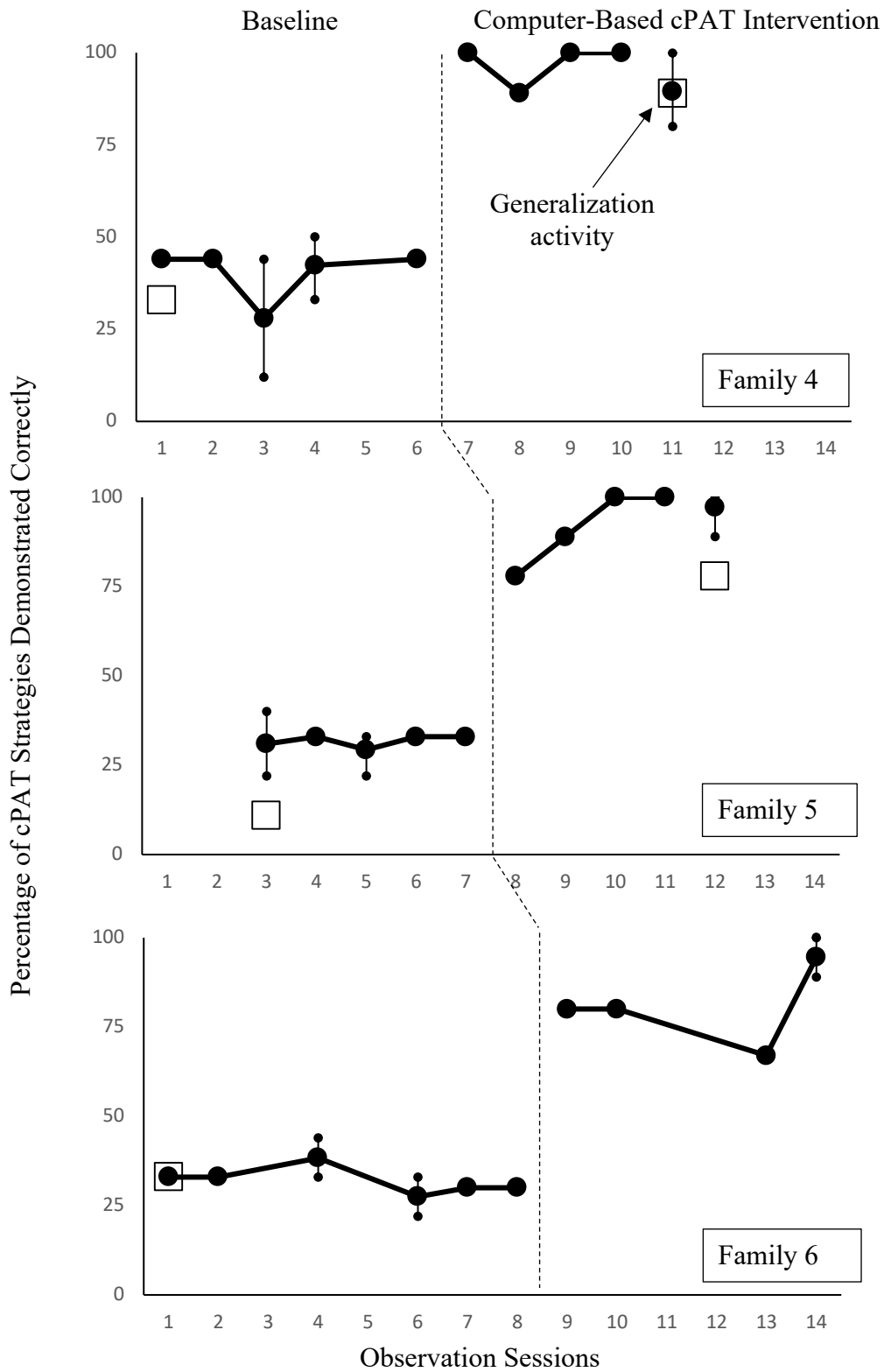


Figure 5. Percentage of cPAT strategies demonstrated correctly across daily activities and a generalization activity in Cohort 2 families in Study 2. High-low lines indicate the range of values for any mean presented on the graph.

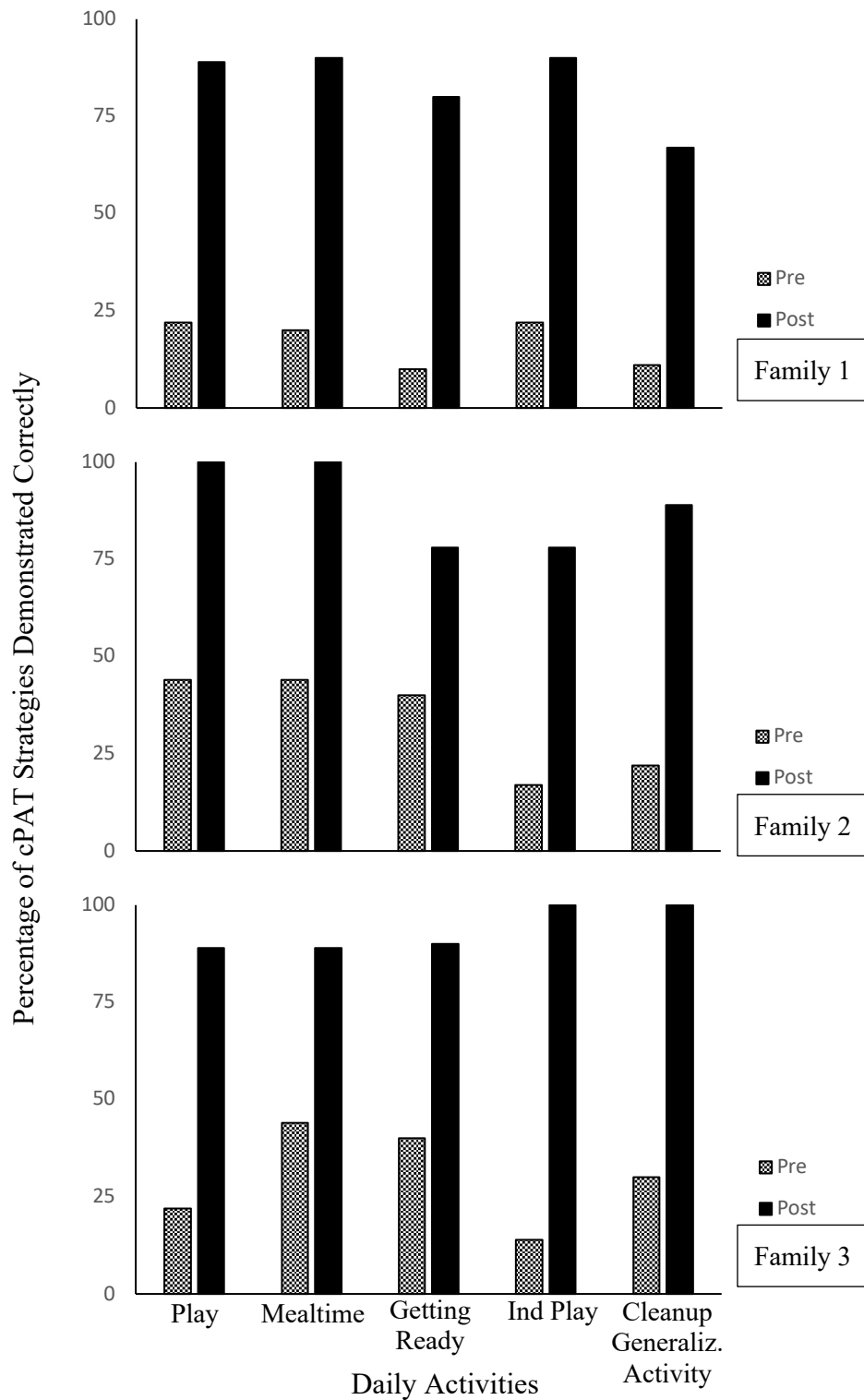


Figure 6. Percentage of cPAT strategies demonstrated correctly in the four daily activities addressed in intervention and a generalization activity at baseline and post-intervention for Cohort 1 families in Study 2.

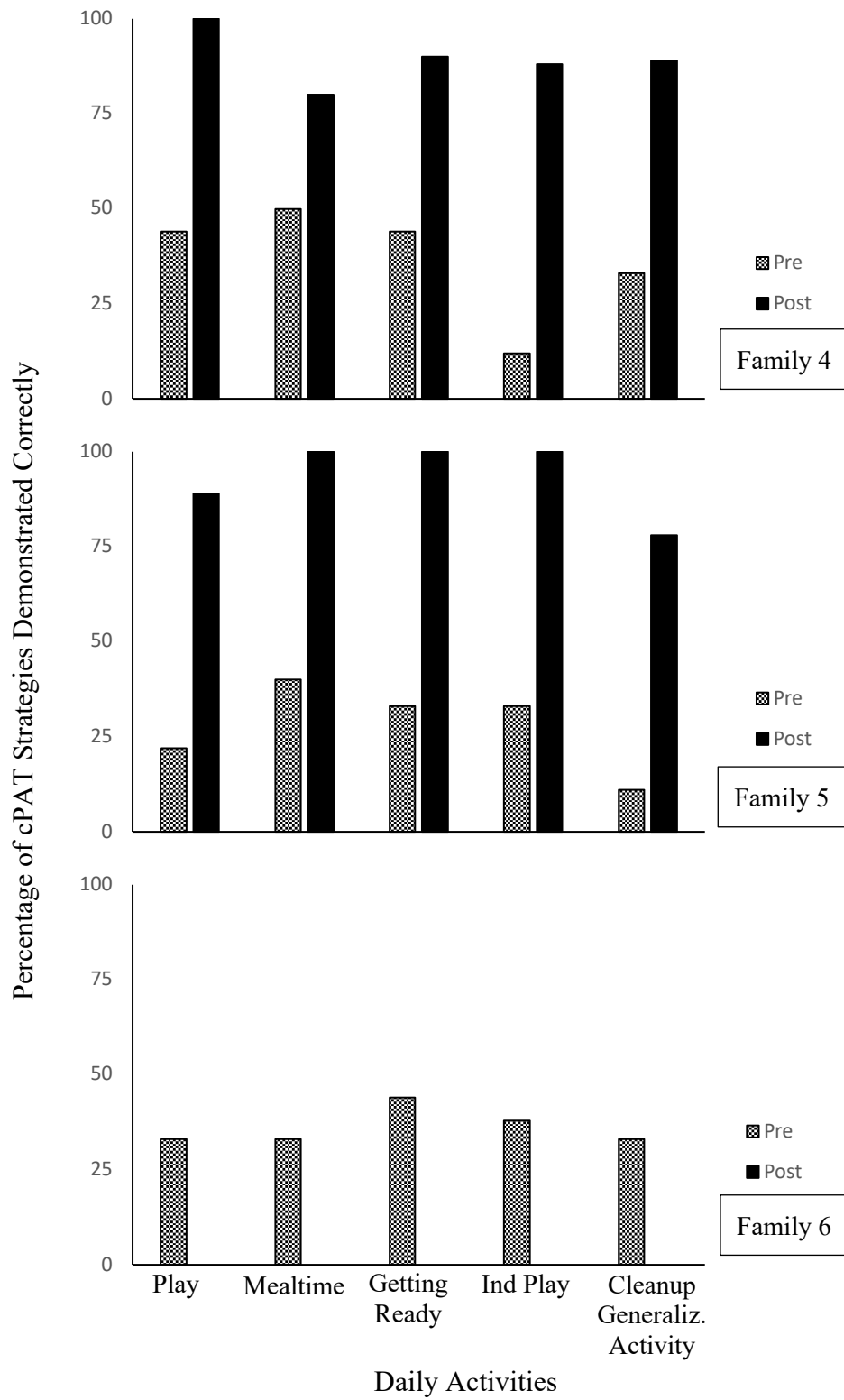


Figure 7. Percentage of cPAT strategies demonstrated correctly in the four daily activities addressed in intervention and a generalization activity at baseline and post-intervention for Cohort 2 families in Study 2.

Appendix A
Screen Captures of Computer Presentation Video Models



Play Video Model 1



Play Video Model 2



Getting Ready Video Model 1



Getting Ready Video Model 2



Mealtime Video Model 1



Mealtime Video Model 2



Independent Play Video Model 1



Independent Play Video Model 2

Appendix B Daily Activities Checklist

Parent: _____ Child: _____ Date: _____ Assessment: Pre Post

- Talk with the parent about each activity
- Put a ✓ for how much change parent reports is needed for each activity
- Make notes as necessary

How much change is needed?

Interactive Home Activities	No change	Very little change	Some change	A lot of change	Notes
Getting your child up in the morning					
Getting your child dressed					
Getting your child ready to leave the house					
Meal preparation					
Meal time/snack time					
Play time with you					
Bed time/nap time					
Other (specify):					

How much change is needed?

Other Activities	No change	Very little change	Some change	A lot of change	Notes
When you are busy (e.g., meal preparation, chores, phone call)					
When you have visitors					
Play time with peers					
Doctor/Dentist/Other appointments					
Shopping/Running errands					
Leaving your child with someone else					
Other (specify):					

Appendix C Child Planned Activities Training (cPAT) One Sheet Summary

Child Planned Activities Training—cPAT

Each day with your child is made up of many different activities. Planning in advance and getting your child involved in those activities can help your child learn new skills, and can make your time with your child more positive and fun. It can also help avoid difficult situations and misbehavior.



BEFORE AN ACTIVITY

Prepare in advance. Have a plan for what you are going to do. Get the supplies or toys ready in advance. Inform your child that the activity is going to happen (for instance, give them a five minute warning).

Explain activity. Get your child's attention. Describe the activity so your child knows what to expect. Be positive and excited.

Explain rules and consequences. Use 1-2 positively stated rules that are simple and realistic. Tell your child what TO DO, instead of what NOT to do. Give a positive consequence for following each rule. As needed, give a negative consequence for not following each rule. Rules let your child know what is expected of them. Giving consequences lets your child know what will happen if they do not follow the rules. Focus on rewards for good behavior, and hold back those rewards when your child does not earn them. The best rewards are your attention and fun activities.

DURING AN ACTIVITY

Talk about what you and your child are doing. Follow your child's lead and talk about what he or she is interested in. Listen to your child, and respond to what he or she has to say. Ask simple questions and describe what your child is doing.

Use good physical interaction skills. Be child friendly. Get down on your child's eye level, use a nice, calm voice and have a nice look on your face. Use nice touches, like a pat on the back, or hold your child's hands when you talk about the rules.

Give choices. Let your child make 2 or more simple choices to show your child that he or she has some say in what happens during the activity.

Praise desired behaviors. Praise your child at least 2 or more times during the activity for good behavior. Be specific about what your child did well. This lets your child know what behavior you like and makes your child more likely to repeat the good behavior in the future.

Ignore minor behavior. The more you pay attention to problem behavior, the more your child will do it. Ignore the behaviors, but not necessarily the child. Catch them being good, instead!

Provide consequences. As needed, follow through with the positive and negative consequences that were stated earlier. This lets your child know you mean what you say. Follow-through is important for increasing good behavior. Being consistent helps your child connect the behavior to a consequence.

AT THE END OF AN ACTIVITY

Wrap-up and give feedback. Inform your child that the activity is ending and describe what your child did that was great. If applicable, let them know what to do better next time.



Appendix D
Parent Demographic and Computer Experience Questionnaire

This is brief survey to help us understand your background. For the purposes of this study, the child that you will be practicing the parenting strategies with is referred to as the FOCUS child. During this survey, you will be asked questions about your child(ren). Please answer the question as it pertains to the FOCUS child, unless the question specifically asks about other children that you may have.

If you have any questions or concerns about what you are being asked in this survey, please check in with research staff for assistance.

Family and Life History

1. What is your birthdate? (mm/dd/yyyy) _____

2. Which type of caregiver listed below best describes you?
 - o Mother
 - o Father
 - o Other (please describe) _____

3. What is your current marital status?
 - o Single
 - o Married
 - o With Partner
 - o Divorced
 - o Widowed
 - o Separated
 - o Other (please describe) _____

4. How do you identify your ethnicity or racial/background? (Select all that apply)
 - o Asian
 - o Black/African American
 - o Caucasian
 - o Hispanic/Latinx
 - o Native American
 - o Pacific Islander
 - o Other (please describe) _____

5. What is YOUR CHILD'S birthdate? (mm/dd/yyyy) _____
6. How do you identify YOUR CHILD'S ethnicity or racial/background? (Select all that apply)
- Asian
 - Black/African American
 - Caucasian
 - Hispanic/Latinx
 - Native American
 - Pacific Islander
 - Other (please describe) _____

7. What is YOUR CHILD'S gender? Male Female

8. At this time, how many nights per week does YOUR CHILD regularly spend with you?
 _____ nights

Answer if your child spends less than 7 nights per week with you on average:

On nights that YOUR CHILD is not with you, where does he/she stay? (Select all that apply)

- Child's father's home
- Maternal grandparents' home
- Paternal grandparents' home
- Other relative's home (please describe)
- Friend's home (please describe)
- Other (please describe)

9. Do you have any other children besides the focus child for this study? Yes No
 If yes, enter the first name/initials and age of each additional child (besides the focus child)

	Child First Name or Initials	Child's Age
Child 1		
Child 2		
Child 3		
Child 4		
Child 5		
Child 6		

Child 7		
Child 8		

10. As of today, what is the highest grade YOU have completed in school?
- Less than 8th grade
 - 8th grade
 - High school (enter actual grade) _____
 - GED/Un-graded (not differentiated by grade)
 - Community or junior college (enter years in program or, if applicable, degree earned)

 - Vocational program (enter years in program or, if applicable, degree earned)

 - 4-year college or university (enter years in program or, if applicable, degrees earned)

 - Graduate school or professional degree program (post-BA/BS) (enter years in program or, if applicable, degree earned)

11. What degrees and/or certificates have you received? (Select all that apply)
- GED
 - High school diploma
 - Associate's degree
 - Bachelor's degree
 - Master's degree
 - Doctoral degree (MD, PhD, PsyD, JD, etc.)
 - Other (please specify) _____
 - None
12. Are you currently in school? Yes No
If yes, what grade or level are you in now?
- Less than 8th grade
 - 8th grade

- o High school (enter actual grade)

- o GED/Un-graded (not differentiated by grade)
- o Community or junior college (enter years in program or, if applicable, degree earned) _____
- o Vocational program (enter years in program or, if applicable, degree earned)

- o 4-year college or university (enter years in program or, if applicable, degrees earned)

- o Graduate school or professional degree program (post-BA/BS) (enter years in program or, if applicable, degree earned)

13. Are you currently working? Yes No
If yes, how many hours per week are you working?

- o Less than 20 hours per week on average
- o 20-30 hours per week on average
- o More than 30 hours per week on average

14. How many people are being supported by your total family income? _____

15. How many people in your household work? _____

16. Which of the following income sources do you and other members of your family receive?
 (Select all that apply)

- Income from current employer/job
- TANF
- Social Security
- SSI (Social Security Insurance)
- Child Support
- Unemployment Compensation
- Worker's Compensation
- SNAP

- Public Housing/Housing Assistance
 - Medicaid
 - WIC
 - Other assistance (please specify)
-

17. Please estimate what your yearly household income from all sources:

Less than \$5,000	\$30,000 - \$34,999	\$60,000 - \$64,999
\$5,000 - \$9,999	\$35,000 - \$39,999	\$65,000 - \$69,999
\$10,000 - \$14,999	\$40,000 - \$44,999	\$70,000 - \$74,999
\$15,000 - \$19,999	\$45,000 - \$49,999	\$75,000 - \$79,999
\$20,000 - \$24,999	\$50,000 - \$54,999	\$80,000 - \$84,999
\$25,000 - \$29,999	\$55,000 - \$59,999	More than \$84,999

Services

We would like to ask you about any special services that you may have received or are currently receiving related to parenting. For each program listed, please answer whether or not you participated in any of their services. If you participated in their services, list the age of your child at the start of your participation and the length of your involvement.

18. Have you been involved with any of the programs listed below for the FOCUS CHILD of this study?

Program	Did you participate?		Age of focus child at start (in years)	Length of involvement (in months)
Healthy Families	Yes	No		
Healthy Start	Yes	No		
Parents as Teachers	Yes	No		
Early Head Start	Yes	No		
Head Start	Yes	No		
Parenting classes or other parenting-related service (please specify)	Yes	No		

19. Have you been involved with any of these same organizations for ANOTHER CHILD?

Program	Did you participate?	Age of focus child at start (in years)	Length of involvement (in months)
Healthy Families	Yes No		
Healthy Start	Yes No		
Parents as Teachers	Yes No		
Early Head Start	Yes No		
Head Start	Yes No		
Parenting classes or other parenting-related service (please specify)	Yes No		

20. What types of things have you done in the past month to manage your child's behavior?

(Select all that apply)

- Using praise
- Giving rewards (i.e., toys, special treats, earning access to things, etc.)
- Setting rules
- Setting logical consequences (i.e., if you make a mess, you have to clean it up)
- Time-out
- Spanking (from a tap on the hand to a swat on the bottom)
- Physical restraint
- Grounding
- Going to bed early
- Talk to child about behavior
- Yelling
- Limiting privileges (i.e., TV watching, video games)
- Other (please specify) _____

21. Do you have a long-lasting or chronic condition (physical, visual, auditory, cognitive or mental, emotional, or other) that substantially limits your parenting abilities?

- Yes
- No
- I prefer not to answer

If yes, please describe the condition(s) you experience:

Technology Experience and Usage

22. Do you own a cell phone?

- Yes
- No

23. What kind of cell phone do you own?

- Smartphone (iPhone, Android, Windows, etc.)
- Blackberry
- Basic phone with only calling and text messaging capabilities
- Other (specify) _____

24. How often do you use your cell phone for any of the following?

Texting	Never	Rarely	Sometimes	Regularly	Daily
Emailing	Never	Rarely	Sometimes	Regularly	Daily
Browsing the Internet	Never	Rarely	Sometimes	Regularly	Daily
Assessing social media	Never	Rarely	Sometimes	Regularly	Daily
Playing games	Never	Rarely	Sometimes	Regularly	Daily
Watching videos	Never	Rarely	Sometimes	Regularly	Daily

25. Do you own any of the following devices or if you don't own them, borrow them from a library or other resource?

Device	Own or Borrow	Frequency of Use				
Desktop computer	Own Borrow	Never	Rarely	Sometimes	Regularly	Daily
Laptop	Own Borrow	Never	Rarely	Sometimes	Regularly	Daily
IPad or other type of tablet	Own Borrow	Never	Rarely	Sometimes	Regularly	Daily
Kindle/Nook or other type of e-book reader	Own Borrow	Never	Rarely	Sometimes	Regularly	Daily

26. How do you access the Internet? (Select all that apply)

- Through an Internet provider (e.g., Google fiber, DSL, etc.)
- From a data plan through a cellular provider (e.g., Verizon, Sprint, AT&T)

- At work on your employer's network or wifi
- Public wifi networks (e.g., at a library)
- Other (specify) _____

27. How frequently do you access the Internet?

- Never
- At least once a month
- At least once a week
- Several time a week
- At least once a day
- Several times a day

28. For the series of statements below, please rate how much you agree or disagree.

I feel comfortable using a smartphone (iPhone, Android, or similar device)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel comfortable using an iPad or other type of tablet device	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel comfortable using a computer or similar device	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I have good computer skills	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am comfortable learning and working with new technologies	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Involvement with Child Protective Services

We find that some families in our study are involved with state child protection agencies. We also understand that in these cases, families may be spending a lot of time and energy with task that those agencies require. We want to be sensitive to those time commitments and requirements. The next few questions will ask about your involvement with child protection agencies.

29. Has your family ever been with a state child protection agency (e.g., Kansas DCF or SRS, Missouri Children's Division, or a different agency in another state)? This can include a previous or current romantic partner, relative, or babysitter that doesn't live with you. It can also include involvement for other children besides the FOCUS child of this study.

- Yes No

If yes, please tell us what happened

30. Is your family currently involved with a state child protection agency?

- Yes No

31. Have you ever had a child removed from your home by a state child protection agency?

- Yes No

If yes, what was the outcome?

- Child never returned home
- Child returned home but was removed again; case pending
- Child returned home permanently
- Other outcome (describe) _____

Appendix E
cPAT Home Visitor Assessment Form

Parent: _____
Child: _____

HV: _____
Activity: _____

Session #: _____
Date: _____

- Scoring:**
- √+ Parent demonstrated the behavior consistently and with ease
Parent must perform all bulleted items to receive this score
 - √ Needs improvement in ease and/or consistency of the behavior
Parent must perform at least one bulleted item to receive this score
 - Did not demonstrate behavior at all

	Parent Behavior	Score	Notes
Before	Prepare in advance <ul style="list-style-type: none"> • Gets supplies/toys ready in advance (includes items already present) • Informs child activity is going to happen 		
	Explain activity <ul style="list-style-type: none"> • Gets the child's attention • Explains the activity 		
	Explain rules & consequences <ul style="list-style-type: none"> • Gives 1+ positively stated rules • Gives 1+ positive consequence 		
During	Talk about you and your child are doing <ul style="list-style-type: none"> • Talks warmly about activity • Uses incidental teaching 		
	Use good physical interactions skills <ul style="list-style-type: none"> • Gets on child's level • Uses good eye-contact 		
	Give choices <ul style="list-style-type: none"> • Lets child have 2+ choices during activity 		
	Praise desired behaviors <ul style="list-style-type: none"> • Uses 2+ labeled praises 		
	Ignore minor misbehavior <ul style="list-style-type: none"> • Ignores minor misbehavior • Score N/A if no misbehavior 		
	Provide consequences <ul style="list-style-type: none"> • Follows through with positive and/or negative consequences as appropriate 		
End	Wrap-up and give feedback <ul style="list-style-type: none"> • Informs child activity is ending • Lets child know what to do better next time (if applicable) 		

Number of (—): _____
 Number of (√): _____
 Number of (√+): _____

Progress
(circle one)
 In Progress
 Success
 Mastery

Negative behaviors:

Appendix F
Parent Engagement Rating Scale (PERS)

Participant ID _____ Session _____ Date _____ Visit Length _____ Observer: _____

Parent Engagement Rating Scale – Adapted for cPAT

Did the parent complete the program today? Yes No

Please answer the following questions based on the number of times each has happened since the last visit.

Number of times the participant rescheduled the appointment _____

Number of times the participant did not show up for the appointment _____

HOW ENGAGED WAS THE CAREGIVER IN TODAY'S VISIT (Please answer each question.)

How much of what you had planned for this visit was conducted today?	<input type="checkbox"/> Completed most or all of what we planned (3) <input type="checkbox"/> Completed some of what we planned (2) <input type="checkbox"/> None, our plans changed, and we only covered other topics (1)
How engaged was the caregiver during the visit?	<input type="checkbox"/> Very (3) <input type="checkbox"/> Somewhat (2) <input type="checkbox"/> Minimally (1) <input type="checkbox"/> Not at all (0)
How much did the caregiver participate in discussions during the visit?	<input type="checkbox"/> Very (3) <input type="checkbox"/> Somewhat (2) <input type="checkbox"/> Minimally (1) <input type="checkbox"/> Not at all (0)
How much did the caregiver participate in learning/practicing new skills during the visit?	<input type="checkbox"/> Very (3) <input type="checkbox"/> Somewhat (2) <input type="checkbox"/> Minimally (1) <input type="checkbox"/> Not at all (0) <input type="checkbox"/> Not applicable—last session
Did the caregiver master the current session's skills ?	<input type="checkbox"/> Competent using new skills (3) <input type="checkbox"/> Somewhat (2) <input type="checkbox"/> Not at all (1) <input type="checkbox"/> Not applicable—last session
Did the caregiver practice new strategies or skills, or complete " homework " since last visit?	<input type="checkbox"/> Clearly completed—caregiver provided examples of practice (3) <input type="checkbox"/> Partially completed—only completed some of what was planned (2) <input type="checkbox"/> Not at all/very little (1) <input type="checkbox"/> Not applicable—first session
Did you experience challenges in engaging the caregiver during the visit?	<input type="checkbox"/> Very little – Caregiver was very engaged (3) <input type="checkbox"/> Some – Caregiver generally attended but had some difficulties (2) <input type="checkbox"/> Very challenging – Caregiver distracted, had trouble attending, etc. (1)
Besides you and mom, who else was present in the home during the visit?	
Describe any distractions in the home or to the parent during the visit:	
To what extent did these distractions appear to affect the parent's engagement during the visit?	<input type="checkbox"/> Very (0) <input type="checkbox"/> Somewhat (1) <input type="checkbox"/> Minimally (2) <input type="checkbox"/> Not at all (3) <input type="checkbox"/> No distractions (3)

Total Points: _____

Total Possible: S1 (21), S2-S4 (24), S5 (18)

Appendix G
cPAT Parent Satisfaction Survey

Thank you for being part of the cPAT program. We would like to learn some of your thoughts and feelings about the training. This will help us make the program better. Thank you for helping us by filling out this survey! Please read the following comments. Select the answer that best describes how you feel about each statement. Be as honest as you can. What you tell us will not affect your interactions with Juniper Gardens Children's Project or any other agencies. You can refuse to answer any question. Please type any comments you have at the bottom of this form.

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)
1. Interacting with my child has become easier.	1	2	3	4	5
2. I have more ideas about activities I would like to do with my child.	1	2	3	4	5
3. Routine activities, like feeding my child and bathing him/her, have become easier.	1	2	3	4	5
4. I believe that this training would be useful to other parents.	1	2	3	4	5
5. I feel confident in my ability to use the cPAT strategies with my child.	1	2	3	4	5
6. I do not feel this training gave me new or useful information or skills.	1	2	3	4	5
7. Practicing during the sessions was useful.	1	2	3	4	5
8. The written materials were useful.	1	2	3	4	5
9. The home visitor was on time to appointments.	1	2	3	4	5
10. The home visitor was warm and friendly.	1	2	3	4	5
11. The home visitor was negative and critical.	1	2	3	4	5
12. The computer presentation was good at explaining the material.	1	2	3	4	5

13. I plan to continue using the cPAT strategies with my child.	1	2	3	4	5
14. Overall, I am satisfied with the cPAT program and my experiences with the program.	1	2	3	4	5

Please type any comments or feedback that you may have below:

Appendix H
cPAT Computer Satisfaction Survey

As you may remember, this study is testing the use of a computer-assisted version of the cPAT program. We would like to get your feedback about your experience with the computer-assisted portion of the program. Please read the following comments. Select the answer that best describes how you feel about each statement. Be as honest as you can. What you tell us will not affect your interactions with Juniper Gardens Children's Project or any other agencies. You can refuse to answer any question. Please type any comments you have at the bottom of this form.

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)
1. The objectives of the computer presentations were clear.	1	2	3	4	5
2. The computer presentations were well-organized.	1	2	3	4	5
3. The material was presented in an interesting manner.	1	2	3	4	5
4. The information was clearly presented and easy to understand.	1	2	3	4	5
5. The video examples were helpful in demonstrating the cPAT strategies.	1	2	3	4	5
6. The length of the computer presentation was appropriate.	1	2	3	4	5
7. The guided practice as the end of each computer presentation was helpful for preparing me to practice using the cPAT strategies with my child.	1	2	3	4	5
8. I enjoyed watching and using the computer presentation.	1	2	3	4	5

Please type any comments or feedback that you may have below:

Appendix J

Computer-Based cPAT Pilot Study Usability and Satisfaction Questionnaire

Computer-Based cPAT Pilot Study Usability and Satisfaction Questionnaire

Date: _____

Participant ID: _____

Sessions tested: 1. Intro-Play 2. Mealtime 3. Getting Ready 4. When You Are Busy/Indep Play

Please rate your overall reaction to the computer-based program.

1. Overall Reaction to the Session(s)

Terrible	1	2	3	4	5	6	7	Wonderful
Difficult	1	2	3	4	5	6	7	Easy
Dull	1	2	3	4	5	6	7	Stimulating

Comments:

2. Ease of reading characters on the screen

Confusing	1	2	3	4	5	6	7	Very Clear
-----------	---	---	---	---	---	---	---	------------

Comments:

3. Organization of information

Confusing	1	2	3	4	5	6	7	Very Clear
-----------	---	---	---	---	---	---	---	------------

Comments:

List the most negative aspect(s):

- 1.
- 2.
- 3.

List the most positive aspect(s):

- 1.
- 2.
- 3.

Do you have any additional feedback or comments that you would like to share?

Appendix K Indicator of Parent Child Interaction (IPCI) Data Sheet

IPCI Observation Tracking Form

Instructions: Initiate a stopwatch with 30-second count down and press video play at the onset of each activity. Watch the caregiver and child interaction for 30 seconds. After 30 seconds have elapsed, pause the video. Alternatively, you can watch the elapsed time on the video screen and pause the video after 30 seconds of the activity have elapsed. After pausing the video, go through each of the caregiver and child items and record whether or not that item occurred in the 30 second interval that you observed (0= No occurrence; 1= Occurrence). Repeat this sequence (play, pause, and record 0 or 1 for parent and child items) for each of the remaining intervals.

CAREGIVER	FREE PLAY										NOTES	TOTAL OCCURRENCE
Accept Warm	30	60	30	60	30	60	30	60	30	60		Acceptance Warmth Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		
Descrip Lang	30	60	30	60	30	60	30	60	30	60		Descriptive Language Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		
Follows Lead	30	60	30	60	30	60	30	60	30	60		Follows Child's Lead Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		
Maint Extend	30	60	30	60	30	60	30	60	30	60		Maintains, Extends Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		
Harsh Critical	30	60	30	60	30	60	30	60	30	60		Harsh Critical Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		
Intrus Restrict	30	60	30	60	30	60	30	60	30	60		Intrusions, Restrictions Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		

CHILD	FREE PLAY										NOTES	TOTAL OCCURRENCE
Positive Feedback	30	60	30	60	30	60	30	60	30	60		Positive Feedback Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		
Sustained Engagement	30	60	30	60	30	60	30	60	30	60		Sustained Engagement Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		
Follow Through	30	60	30	60	30	60	30	60	30	60		Follow Through Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		
Irritable/Fuss/Cry	30	60	30	60	30	60	30	60	30	60		Irritable/Fuss/Cry Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		
External Distress	30	60	30	60	30	60	30	60	30	60		External Distress Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		
Frozen/ Watchful/ Withdrawn	30	60	30	60	30	60	30	60	30	60		Frozen/Watchful/Withdrawn Total Occurrence
	1	2	3	4	5	6	7	8	9	10		0
	1	2	3	4	5	6	7	8	9	10		

Appendix L Child Behavior Rating Scale (CBRS)

Child Behavior Rating Scale (CBRS)

ID Number _____ Date: _____ Session #: _____

Please rate each question from 1 to 5; circle your response. Use the definitions below the ratings as a guide.
Circle NOB is you did not observe the behaviors in question.

1. How engaged is the child with toys or materials?

	1	2	3	4	5
NOB	Child shows little appropriate play behavior, engagement with materials or toys.		Child exhibits engagement with materials/toys during the observation half the time.		Child is highly engaged with materials or toys throughout the observation and plays with them appropriately.

2. How appropriately does the child seek the attention of the caregiver?

(i.e., how does the child start an interaction when one was not already ongoing?)

	1	2	3	4	5
NOB	Child attempts to get the attention of the CG through whining, crying, or yelling.		Child's attempts to get CG's attention are sometimes appropriate.		Child's attempts to get CG's attention are always appropriate.

3. How well does the child respond to the caregiver's directions?

Only score if there were at least 3 instructions/directions given by the parent to the child.

	1	2	3	4	5
NOB	Child frequently ignores the CG's directions or is frequently very slow to respond.		Child sometimes ignores the CG's directions or is sometimes slow to respond.		Child consistently is quick to respond to CG's directions.

4. How consistently does the child respond to the caregiver's positive physical and/or verbal initiations and/or interactions during play or conversation?

	1	2	3	4	5
NOB	Child actively ignores or rejects CG's initiations		Child sometimes responds to CG's initiations.		Child consistently responds positively to CG's initiations.

5. What is the child's general affect during the observation?

	1	2	3	4	5
NOB	Child is largely defiant/angry/upset throughout observation.		Child is neutral and in general is neither positive nor negative.		Child is positive and agreeable throughout the observation.

Comments:

Appendix M Computer-Based cPAT Family Coach Checklist (Fidelity Measure)

Participant ID _____ Session _____ Date _____ Visit Length _____ Observer: _____

Computer-Based cPAT Family Coach Checklist

Yes = Coach performed task	No = Coach didn't perform task	N/A = No opportunity		
1. Materials ready	Yes	No	N/A	
2. Sets agenda with parent	Yes	No	N/A	
3. Conducts cPAT observation. List activity: _____ Record parent performance on cPAT assessment form.	Yes	No	N/A	
4. After observation, provides positive descriptive praise	Yes	No	N/A	
5. After observation, provides prompts regarding skills needing improvement	Yes	No	N/A	
6. Additional modeling, practice, and feedback as needed cPAT score ≥ 89%: parent moves on to next activity cPAT score = 88-50%: coach gives feedback on the current focus activity, parent role-plays or gives examples of how to demonstrate skills, and then parent moves on to next activity cPAT score < 50%: parent repeats previous session	Yes	No	N/A Score N/A if cPAT score ≥ 89%	
Describe additional modeling, practice, & feedback:				
7. Reviews progress since last visit	Yes	No	N/A	
8. Inquire about cPAT practice since last visit	Yes	No	N/A	
9. Provide positive feedback	Yes	No	N/A	
10. Discuss any concerns or problems parent experienced in practice	Yes	No	N/A	
11. Plays session slideshow for parent	Yes	No	N/A	
How attentive was the parent to the slideshow? <input type="checkbox"/> Very <input type="checkbox"/> Somewhat <input type="checkbox"/> Minimally <input type="checkbox"/> Not at all If any rating below "very", please explain what happened:				
12. Prompts parent to practice PAT in same activity that was discussed at the end of slideshow.	Yes	No	N/A	
13. Provides prompts as needed (during parent practice)	Yes	No	N/A	
Record # of PAT steps parent performed correctly in practice:				
14. Provides positive, descriptive praise following practice	Yes	No	N/A	
15. Provides instructions regarding skills needed improvement	Yes	No	N/A	
16. Additional modeling, practice, feedback, as needed cPAT score ≥ 89%: parent moves on to next activity cPAT score = 88-50%: coach gives feedback on the current focus activity, parent role-plays or gives examples of how to demonstrate skills, and then parent moves on to next activity cPAT score < 50%: parent repeats practice from beginning if possible	Yes	No	N/A Score N/A if cPAT score ≥ 89%	
Describe additional modeling, practice & feedback:				
17. Specific plan with parent for practice before next visit, suggesting specific skills	Yes	No	N/A	
18. Summarize, ask if there are questions, provide general positive feedback	Yes	No	N/A	
Total				
Total Possible				
Percent Correct				

Notes: (log parent questions, comments, observations)

*Instructions for the observer using this form to rate coach fidelity

- Please score a Yes (coach performed task), No (coach didn't perform task), or N/A (no opportunity/not applicable) for each task listed on the previous page.
- When finished, summarize the total steps performed (# of Yes's), total steps possible, and calculate the percent correct.

Appendix N

Reliability Quizzes Testing Knowledge of cPAT and IPCI Observation Codes

Name: _____

Date: _____

cPAT Strategies Reliability Quiz

1. List the strategies that should occur before the activity.
2. List the strategies that should occur during the activity.
3. List the strategies that occur at the end of the activity.
4. Statements such as “Good Job!” count as descriptive praise. **True or False**
5. If a parent is observed only giving one choice during the activity, the parent will get a check for demonstrating the “Give Choices” strategy. **True or False**
6. If a parent is observed only giving one statement of descriptive praise, the parent will get a check for demonstrating the “Praise Desired Behavior” strategy. **True or False**
7. If there are two children present during an observation and the parent pays attention to minor misbehavior of the other child (not the focus child of the study), do you give the mom a minus for NOT demonstrating the “Ignore Minor Misbehavior” strategy? **Yes or No**
8. How do you score the cPAT checklist when a parent states a rule positively, but forgets to state a consequence OR states the consequence negatively? *Choose one answer.*
 - a. You give the parent a check because at least one of the bulleted items on the list was completed correctly.
 - b. You give the parent a check plus because she did everything she was supposed to do for the strategy.
 - c. You give the parent a minus because all the bulleted items were not completed.
9. How do you score the cPAT checklist when you do not observe the child engaging in any minor misbehavior during the observation? *Choose one answer.*
 - a. You give the parent a check or check plus.
 - b. You give the parent a minus.
 - c. You write n/a and exclude that strategy from entire score. In this case, the total possible will be 9 instead of 10.
10. How do you score the cPAT checklist when the parent tells the child the activity is ending but does not give feedback? *Choose one answer.*
 - a. You give the parent a check because at least one of the bulleted items on the list was completed correctly.
 - b. You give the parent a check plus because she did everything she was supposed to do for the strategy.
 - c. You give the parent a minus because all the bulleted items were not completed.

Name: _____

Date: _____

IPCI Reliability Quiz

1. Caregiver Domain: Match the IPCI item with its definition by drawing a line to connect them.

Conveys acceptance and warmth.

Parent responds to a child's interest in such a way that the child's interest is continued or extended.

Uses descriptive language

Parent engages in name-calling, sarcastic tone of voice, raised voice, or critical statements about the child.

Follows child's lead

The adult conveys acceptance and warmth through approval by smiling, making a positive comment, providing gentle touch, agreeing with what the child said, indicating that the child is correct, confirming what the child has just said, thanking the child for something, or stating the child make a good effort.

Maintains or extends child's focus

The caregiver notices what interests the child and specifically comments on the child's interest or joins in the same activity with some kind of action without interrupting the child.

Uses criticism or harsh voice

When parent comments to the child, the comment (1) both labels and connects objects/persons and action or (2) labels and connects objects and adjectives in a complete sentence.

Uses restrictions/intrusions

Parent uses instructions such as "No, Don't, Stop, Quit." Parent takes things away from child unnecessarily, controls the child's movement unnecessarily, uses physical discipline, or pushes objects in front of child's face.

2. The child is playing roughly and the parent says "Be careful!" on several occasions without providing another support.

What caregiver item is this an example of? _____

If the parent only said "Be careful" once, would you score this behavior as occurring? **Yes or No**

3. The parent makes a negative comment to the child while smiling or laughing. Do you score Conveys Acceptance and Warmth as occurring? **Yes or No**
4. Does the parent need to be engaging in Follows Child's Lead before you can score the occurrence of Maintains or Extends Child's Focus? **Yes or No**